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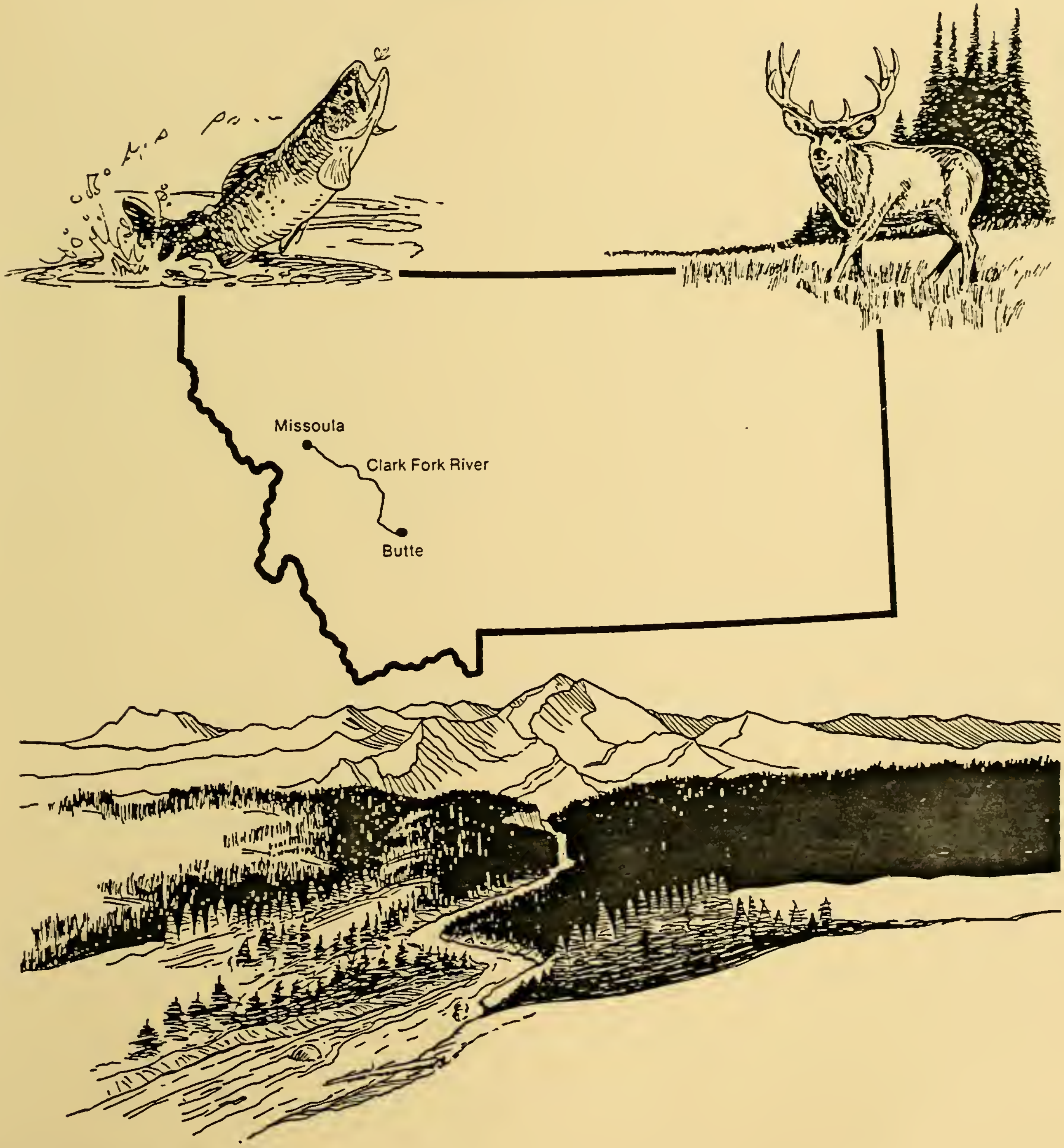
STATE OF MONTANA
NATURAL RESOURCE DAMAGE PROGRAM

ANACONDA GROUNDWATER INJURY ASSESSMENT REPORT
DEER LODGE VALLEY, MONTANA

JANUARY 1995



APR 16 2004

ANACONDA GROUNDWATER INJURY ASSESSMENT REPORT

Prepared for
Department of Justice
Natural Resource Damage Litigation Program

Prepared by

William W. Woessner, Ph.D.
126 McLeod Avenue
Missoula, Montana

William W Woe

William W. Woessner, Ph.D.

January, 1995

I am prepared to testify as to the appropriateness of the statistical methodologies used in the following reports and that the differences between groundwater conditions of the control and assessment areas, in each one of these reports, are statistically different under D.O.I. Regulation, 43 C.F.R. § 1172(h)(5):

1. *Anaconda Groundwater Injury Assessment Report, Deer Lodge Valley, Montana.* By William W. Woessner, Ph.D., January 1995.
2. *Milltown Groundwater Injury Assessment Report.* By William W. Woessner, Ph.D., January 1995.
3. *Rocker Groundwater Injury Assessment Report, Rocker, Montana.* By William W. Woessner, Ph.D., January 1995.
4. *Montana Pole Treatment Plant Ground Water Injury Assessment, Butte, Montana.* By John J. Metesh, Montana Bureau of Mines and Geology, April 1993.

Richard J. Brand 1/10/95

Richard J. Brand, Ph.D.

EXECUTIVE SUMMARY

More than 15 square miles of the land surface in the vicinity of Anaconda, Montana, are contaminated with metals and other constituents. Over 260 million cubic yards of tailings, soils and sediment contain thousands of tons of hazardous substances and wastes. Infiltration of process water and waste water during almost 100 years of smelter operation plus natural recharge and seepage from Warm Springs Ponds have resulted in degraded groundwater. Median concentrations of constituents found in groundwater in a 40 square mile area beneath, and adjacent to smelting facilities and waste piles exceed drinking water standards for one or more of the following constituents: arsenic, cadmium, chromium, copper, fluoride, iron, lead, manganese, mercury, sulfate TDS and zinc. Volumes of groundwater with one or more constituents that exceed drinking water standards range between 368,000 and 494,500 acft. More than 8,000 acft of contaminated groundwater discharge from both the Opportunity Ponds area and the northern berm of Warm Springs Pond #1 each year.

Contamination of the groundwater in the Anaconda region is a direct result of smelting operations and waste disposal methods. The water quality degradation observed today is both a remnant of past actions and a product of present day conditions. Impacts are long term, as natural hydrologic processes occurring today will continue to mobilize the seemingly inexhaustible supply of contaminants for thousands of years.

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INTRODUCTION

This report presents an analysis of the character of the mining and smelting waste sources, the mechanisms and pathways by which hazardous substances enter the groundwater system, and the distribution of contaminants in the groundwater system of the southern portion of the Deer Lodge Valley (Plate 1) (Figure 1).

Site Description

The area surrounding present day Anaconda, Montana, was used for smelting copper by the Anaconda Company and its predecessors between 1884 and 1980. As a result, hazardous substances disposed of in the region and associated with processing facilities cover more than 15 square miles. This region containing processing facilities and wastes has been designated a Superfund Site and, as a result, is divided into a number of CERCLA Operable Units (Figure 2). The wastes found in this region typically contain high levels of arsenic, metals, and other constituents. Groundwater in this region has been affected by the site history and is contaminated with a variety of hazardous materials.

The smelting site, related waste disposal sites, and the settling ponds at Warm Springs all contain elevated concentrations of metals. Various studies of the waste character and the groundwater quality have been undertaken in the last 30 years, the majority of which have occurred since 1980 when the smelting operation permanently closed. Extensive work by TETRA TECH (1985; 1986; 1987) and studies associated with the CERCLA process (Figure 2), have addressed hydrogeologic conditions in varying degrees of detail. A description of the geology, climate, surface water resources and hydrogeology of the Anaconda area follows.

Geology

The southern portion of the Deer Lodge Valley formed between 60 and 40 million years ago when a bedrock block moved down relative to the surrounding rock, forming a structurally controlled basin (Figure 3). The Flint Creek Range borders the valley to the west. This range is composed of Precambrian to Tertiary igneous, metamorphic and sedimentary rocks that have been subjected to uplift, faulting and erosion. The smelter site at Anaconda was located on bedrock just west of the valley floor and is referred to as Smelter Hill (Figures 2 and 3). The hill is primarily composed of rhyolitic tuffs that are light colored and fine to medium grained in texture (Figure 4). The northeastern flank of the area is covered by travertine deposits at the surface with thick deposits of Tertiary and Quaternary alluvium underlying the hot spring deposits (PTI, 1991). Conceptualized cross sections of the northern and eastern side of the Smelter Hill are presented in Figures (5 and 6).

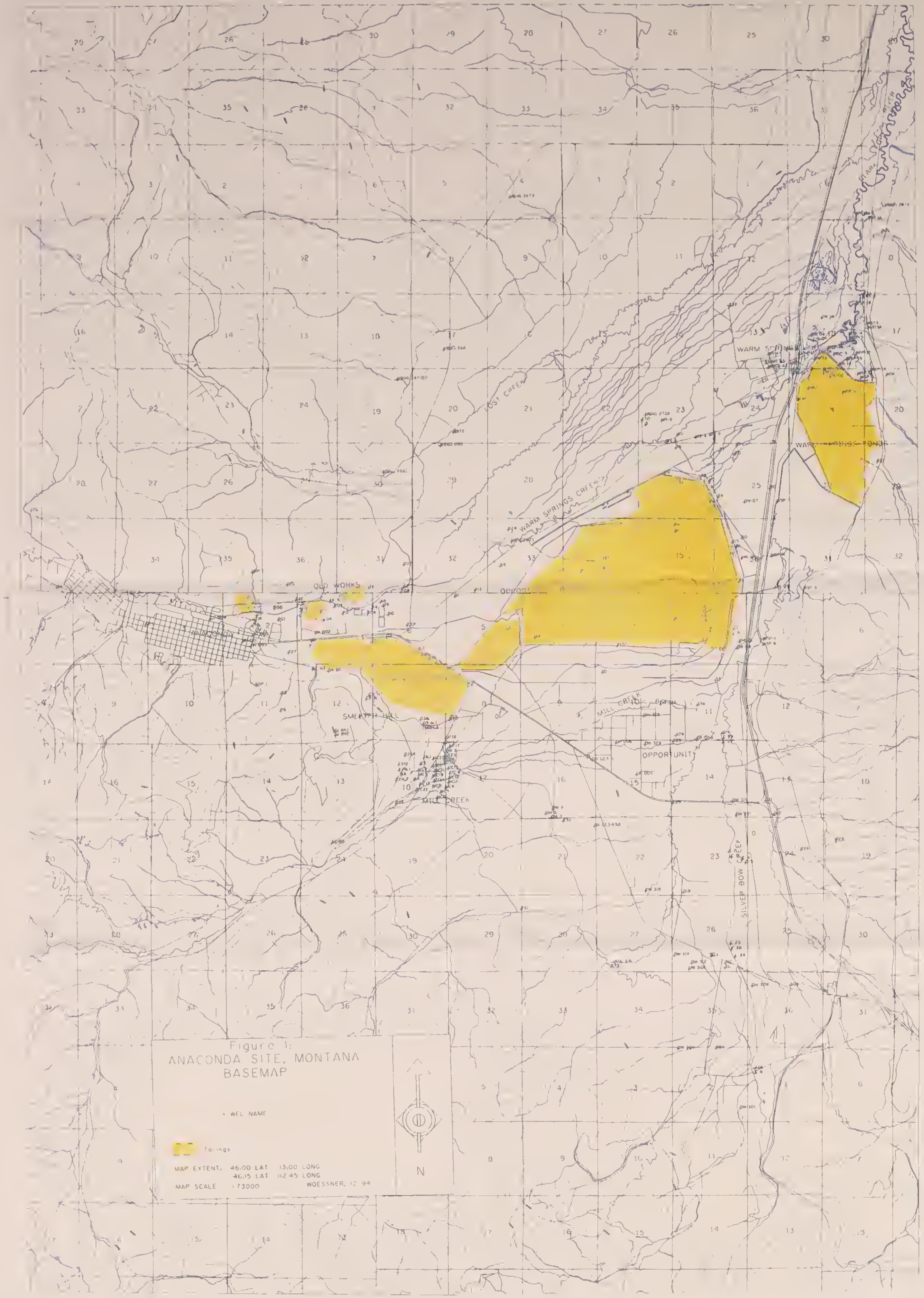


Figure 1:
ANACONDA SITE, MONTANA
BASEMAP

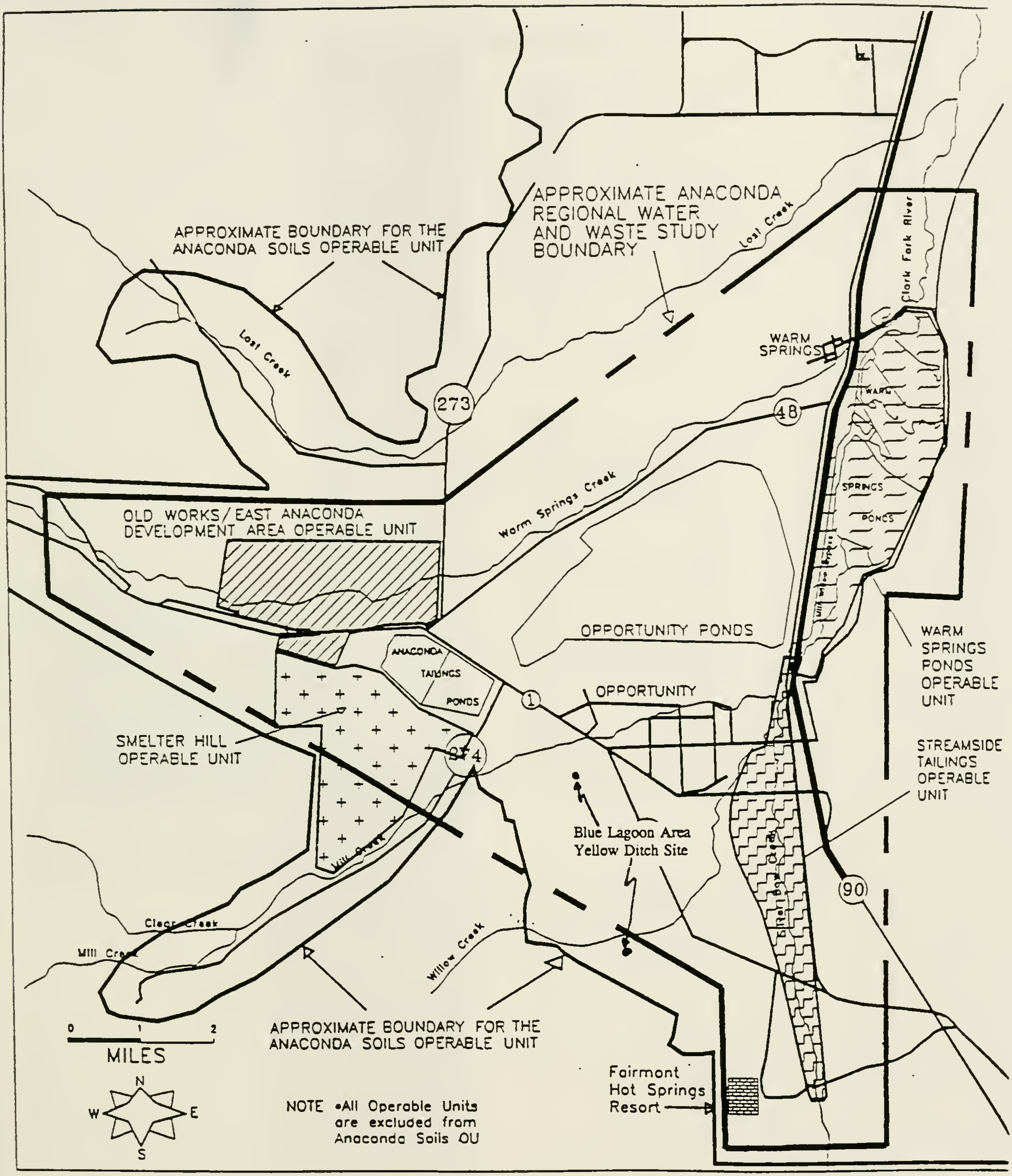

APPROXIMATE ANACONDA REGIONAL WATER AND WASTE STUDY BOUNDARY
APPROXIMATE BOUNDARY FOR THE ANACONDA SOILS OPERABLE UNIT
Lost Creek
Clark Fork River
WARM SPRINGS
273
48
Warm Springs Creek
OLD WORKS/EAST ANACONDA DEVELOPMENT AREA OPERABLE UNIT
WARM SPRINGS PONDS
OPPORTUNITY PONDS
ANACONDA TAILINGS PONDS
WARM SPRINGS PONDS OPERABLE UNIT
1
OPPORTUNITY
SMELTER HILL OPERABLE UNIT
274
STREAMSIDE TAILINGS OPERABLE UNIT
Blue Lagoon Area
Yellow Ditch Site
Mill Creek
Clear Creek
Willow Creek
Silver Bow Creek
90
0 1 2
MILES
N S E W
APPROXIMATE BOUNDARY FOR THE ANACONDA SOILS OPERABLE UNIT
NOTE •All Operable Units are excluded from Anaconda Soils OU
Fairmont Hot Springs Resort

Figure 2: Approximate boundaries of CERCLA study sites in the Anaconda region (ESE, 1992).

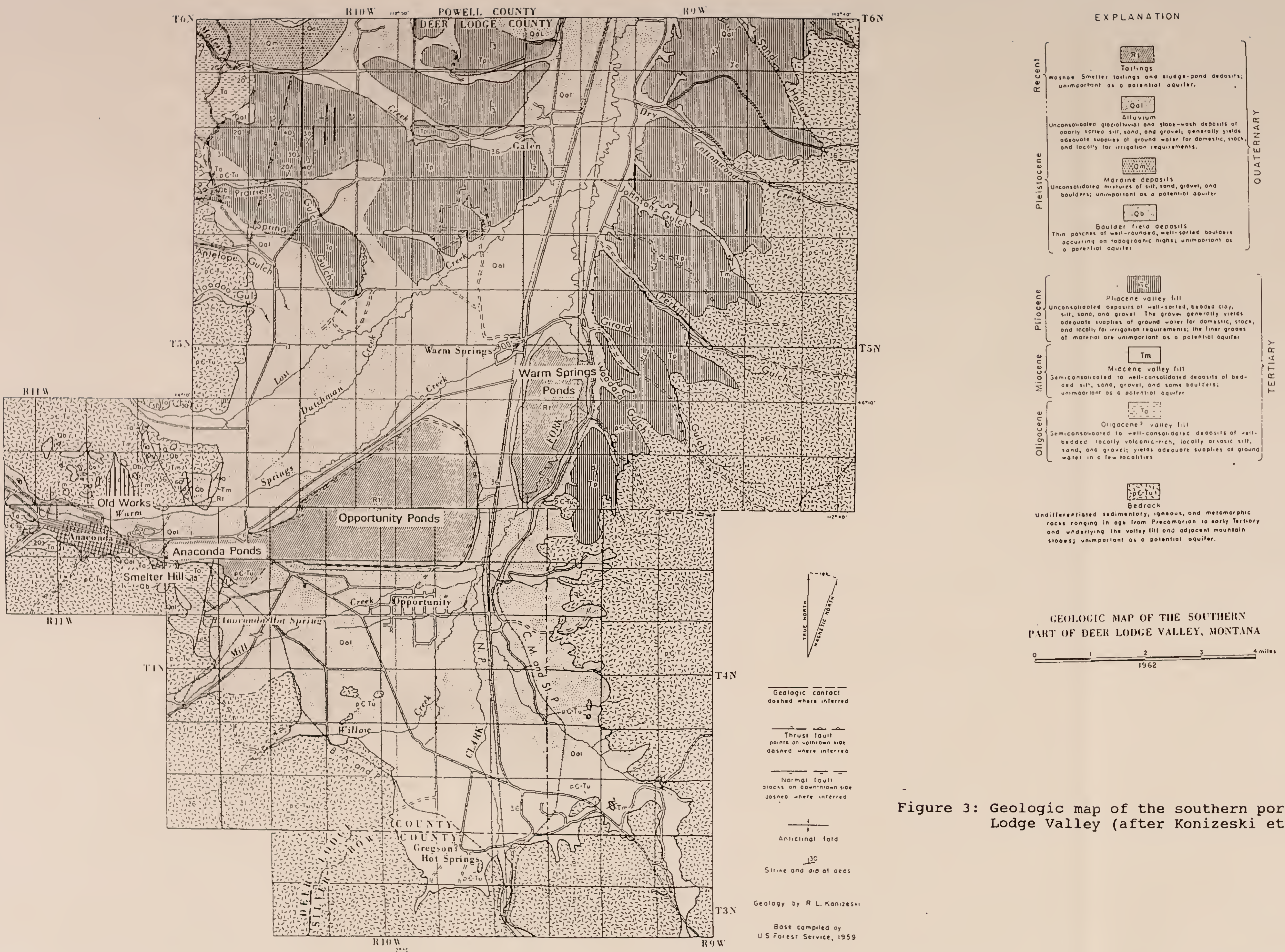

POWELL COUNTY
DEER LODGE COUNTY
T6N
T5N
T4N
T3N
R11W
R10W
R9W
Galen
Warm Springs
Warm Springs Ponds
Opportunity Ponds
Anaconda Ponds
Old Works
Anaconda
Smelter Hill
Opportunity
Anaconda Hot Springs
Gregson Hot Springs
Willow Creek
Lost Creek
Dutchman Creek
Warm Springs Creek
Mill Creek
Prairie
Antelope Gulch
Hoodoo Gulch
Dry Cottonwood Creek
Sand Hollow
Johnson's Gulch
Perkins Gulch
Girard Gulch
Woodward Gulch
CLARK FORK
N.P.
C.M. and St.P.
B.A. and P.
DEER LODGE COUNTY
SILVER BOW COUNTY
TRUE NORTH
MAGNETIC NORTH
EXPLANATION
Recent
Pleistocene
QUATERNARY
Rt
Tailings
Washoe Smelter tailings and sludge-pond deposits; unimportant as a potential aquifer.
Qal
Alluvium
Unconsolidated glaciofluvial and slope-wash deposits of poorly sorted silt, sand, and gravel; generally yields adequate supplies of ground water for domestic, stock, and locally for irrigation requirements.
Qm
Moraine deposits
Unconsolidated mixtures of silt, sand, gravel, and boulders; unimportant as a potential aquifer
Qb
Boulder field deposits
Thin patches of well-rounded, well-sorted boulders occurring on topographic highs; unimportant as a potential aquifer
Pliocene
Miocene
Oligocene
TERTIARY
Tp
Pliocene valley fill
Unconsolidated deposits of well-sorted, bedded clay, silt, sand, and gravel. The gravel generally yields adequate supplies of ground water for domestic, stock, and locally for irrigation requirements; the finer grades of material are unimportant as a potential aquifer
Tm
Miocene valley fill
Semiconsolidated to well-consolidated deposits of bedded silt, sand, gravel, and some boulders; unimportant as a potential aquifer
To
Oligocene? valley fill
Semiconsolidated to well-consolidated deposits of well-bedded locally volcanic-rich, locally arkosic silt, sand, and gravel; yields adequate supplies of ground water in a few localities
pC-Tu
Bedrock
Undifferentiated sedimentary, igneous, and metamorphic rocks ranging in age from Precambrian to early Tertiary and underlying the valley fill and adjacent mountain slopes; unimportant as a potential aquifer.
Geologic contact
dashed where inferred
Thrust fault
points on upthrown side
dashed where inferred
Normal fault
blocks on downthrown side
dashed where inferred
Anticlinal fold
Strike and dip of beds
Geology by R. L. Konizeski
Base compiled by U.S. Forest Service, 1959
GEOLOGIC MAP OF THE SOUTHERN PART OF DEER LODGE VALLEY, MONTANA
0
1
2
3
4 miles
1962

Figure 3: Geologic map of the southern portion of the Deer Lodge Valley (after Konizeski et al., 1982).

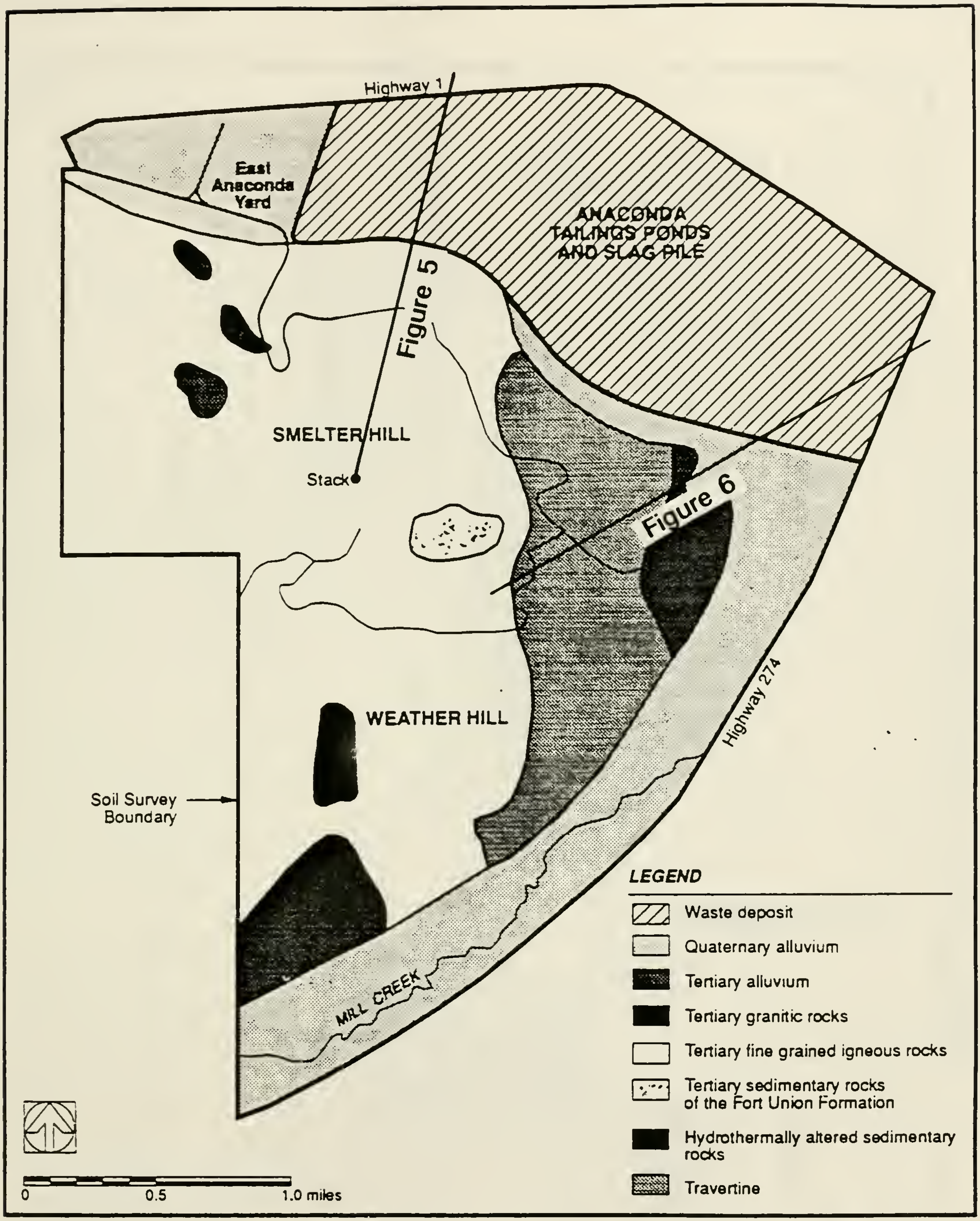


Figure 4: Geologic map of Smelter Hill and vicinity showing the approximate location of conceptual cross sections presented in Figures 5 and 6 (after PTI, 1991).

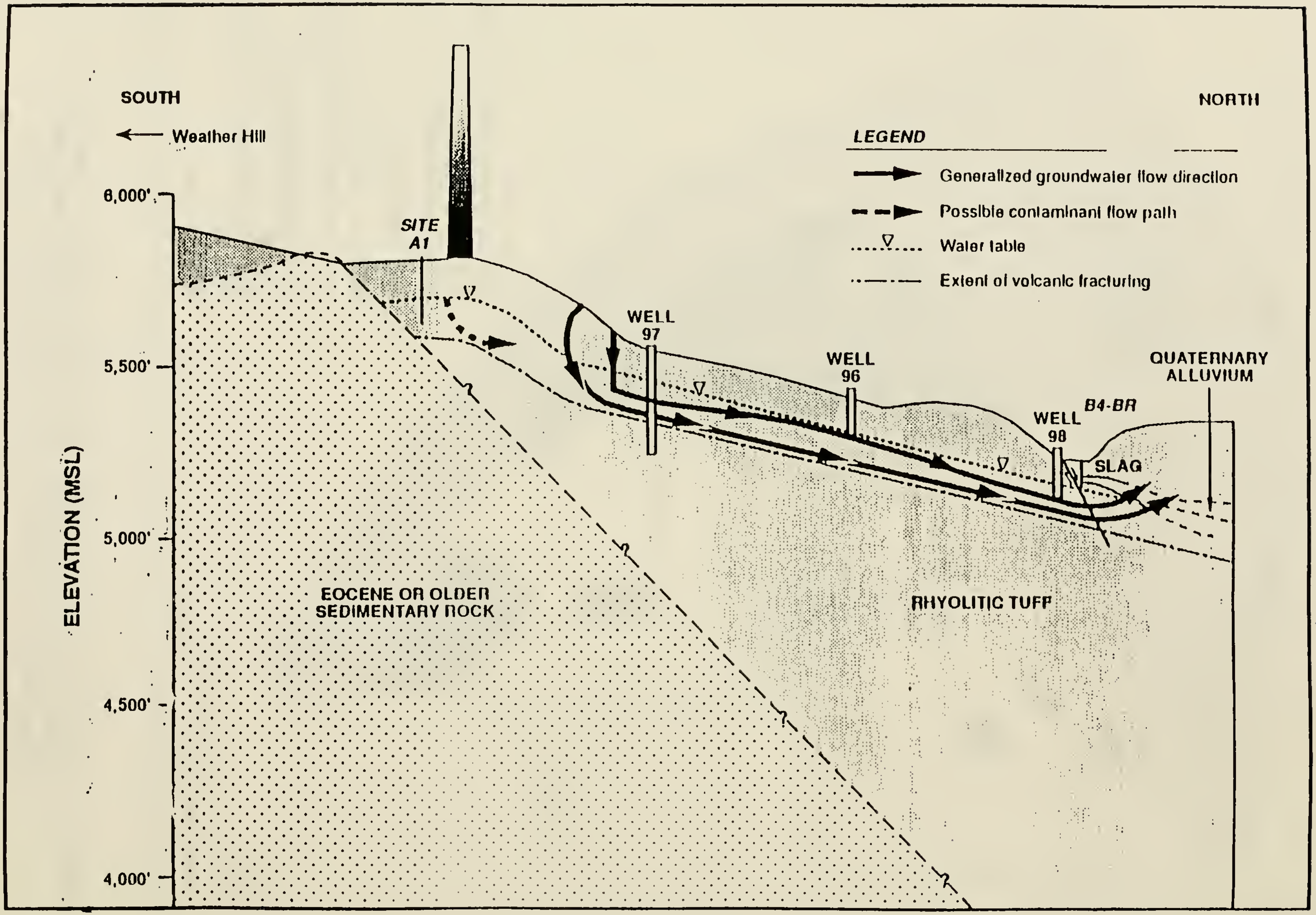

SOUTH
← Weather Hill
NORTH
LEGEND
Generalized groundwater flow direction
Possible contaminant flow path
..... ∇ ..... Water table
Extent of volcanic fracturing
ELEVATION (MSL)
6,000'
5,500'
5,000'
4,500'
4,000'
SITE A1
WELL 97
WELL 96
WELL 98
B4-BR
SLAG
QUATERNARY ALLUVIUM
EOCENE OR OLDER SEDIMENTARY ROCK
RHYOLITIC TUFF
?
?
?
?

Figure 5: Conceptual cross sectional geohydraulic model for eastern portion of Smelter Hill (PTI, 1991).

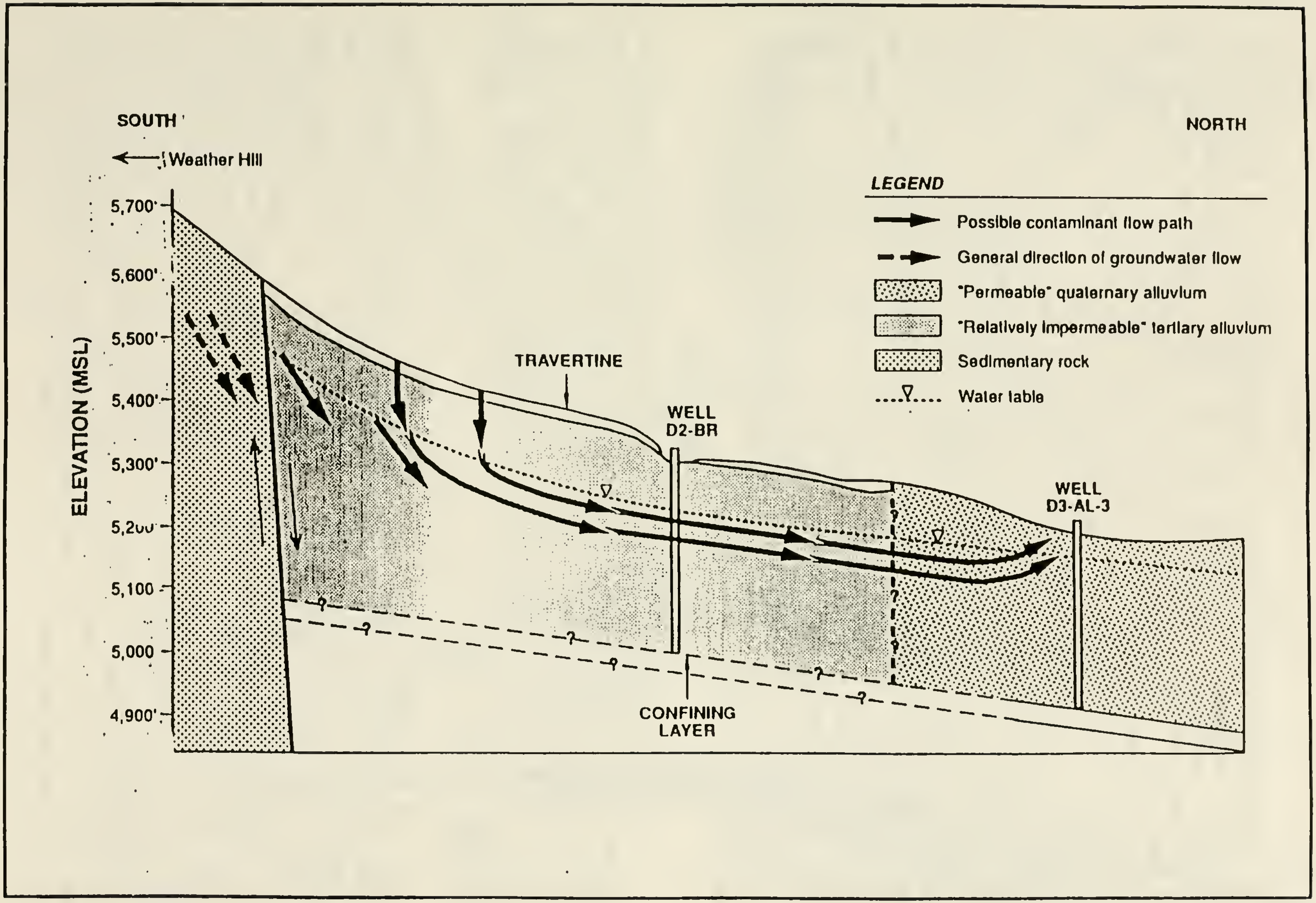


Figure 6: Conceptual cross sectional geohydraulic model for the northern portion of Smelter Hill (PTI, 1991).

The southern portion of the Deer Lodge valley is filled with Tertiary sediments and Quaternary valley alluvium (Figure 3). Tertiary sediments are over 2000 ft thick. Semi-consolidated siltstone, sandstone, and conglomerate occupy about three-fourths of the basin. The upper 200 to 300 ft of material is composed of unconsolidated valley fill material weathered from the volcanic, sedimentary and crystalline bedrock slopes (Konizeski et al., 1962; Konizeski, et al, 1968). ESE (1992) prepared a conceptual cross section of the basin geology (Figures 7 and 8). Quaternary alluvium covers most of the valley floor in the southern end of the valley. Its apparent thickness is approximately 25 ft, on the average, with a range of between 100 ft at stream canyon mouths and about 10 ft near the Clark Fork River. These deposits are composed mostly of glacio-fluvial sediments (Konizeski et al., 1968; Konizeski et al., 1962). ESE (1992) describes deposits that cover the braided stream plain, formed by the coalescing deposits which originated from the mouths of Silver Bow Creek, Mill Creek, Warm Springs Creek and Lost Creek, as very coarse glacial outwash. Three geologic cross sections (Figure 7) based on shallow boring data are presented in Figures 9 to 11. The thickness of the Quaternary deposits beneath the Anaconda and Opportunity tailings ponds has not been established, nor has the detailed stratigraphy of the underlying unconsolidated and semi consolidated Tertiary deposits.

Climate and Hydrology

Average annual precipitation in the vicinity of Anaconda is 13.84 inches, approximately two thirds of which occurs in the spring (ESE, 1992; ESE, 1994). The driest year was 1979 with 7.90 in of precipitation recorded and the wettest, 1989, 19.13 in in 1993, 15.36 in of precipitation fell over the study area (ESE, 1994). ESE (1992) reported evaporation rates recorded using standard Class A pans averaged 48.86 inches for an eight month period. July evaporation averaged 10.41 inches, the highest monthly rate.

The principal surface water resource in the area is the Clark Fork River which forms just below Warm Springs Ponds at the confluence of Silver Bow Creek, Mill Creek, and Warm Springs Creek (Figure 1). The mean annual flow of the Clark Fork River at Deer Lodge is about 250 cfs (Konizeski et al, 1962). The average flow below Warm Springs Ponds was recorded to be 60 cfs in 1992 and 150 cfs in 1993 (ESE, 1994). Silver Bow Creek has a mean annual flow of about 70 cfs as it enters three treatment and settling ponds near Warm Springs, Montana (ESE, 1992). Average flows in 1992 and 1993 were 32 and 55 cfs, respectively. The Warm Springs Ponds 1 and 2 were constructed before 1920 and Pond 3 in 1958 to trap tailings and wastes migrating downstream from the Butte and the Anaconda region (CH2M Hill and Chen-Northern, 1989) (Figure 12). Warm Springs Creek near Anaconda has mean flows of 52 and 100 cfs in 1992 and 1993, respectively. Mill Creek flows averaged 10 and 50 cfs in 1992 and 1993, and mean flows of Willow Creek during the same time period were 1.5 to 3 cfs (ESE, 1994). The Mill-Willow

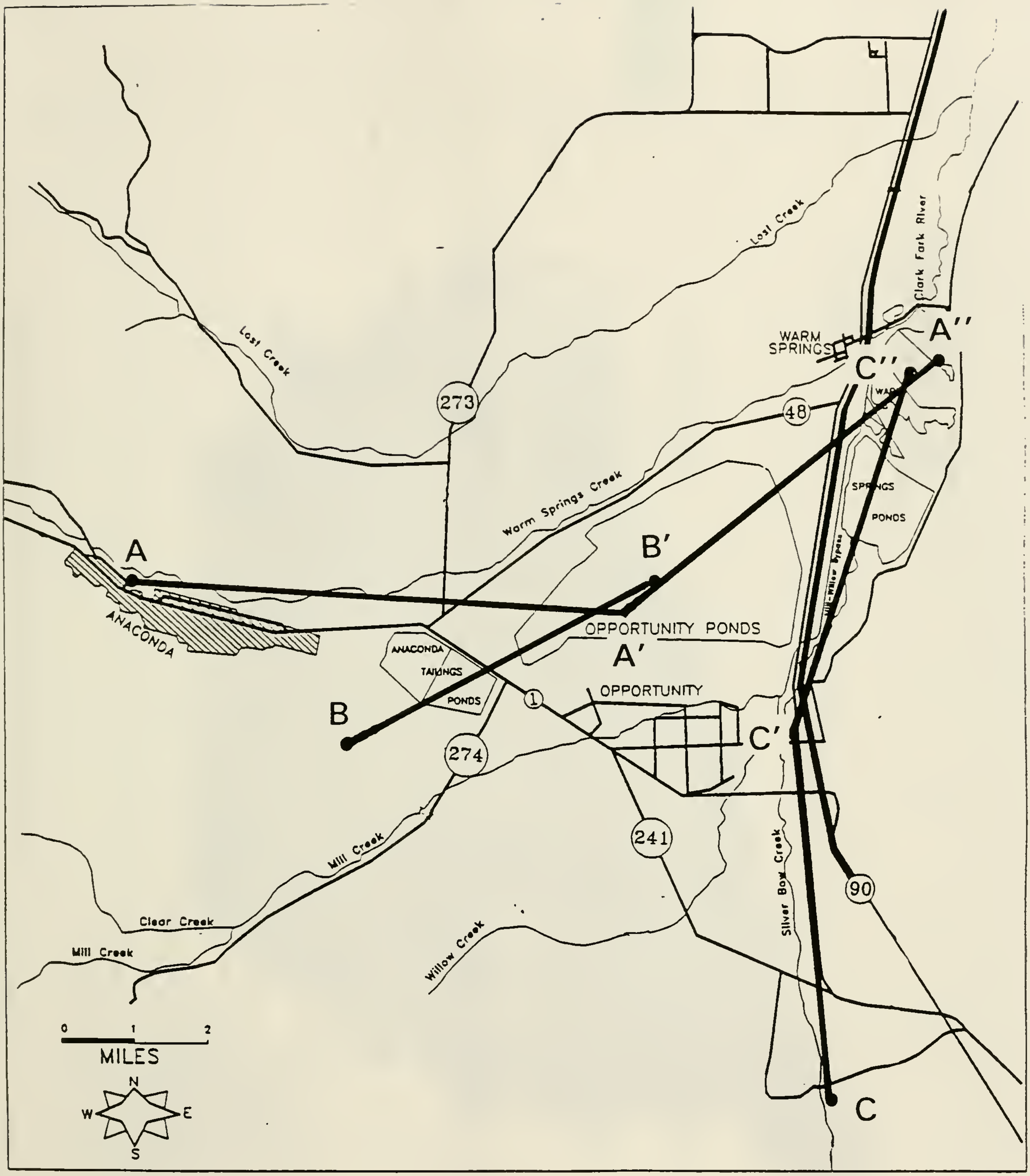


Figure 7: Location of geologic cross sections (after ESE, 1992).

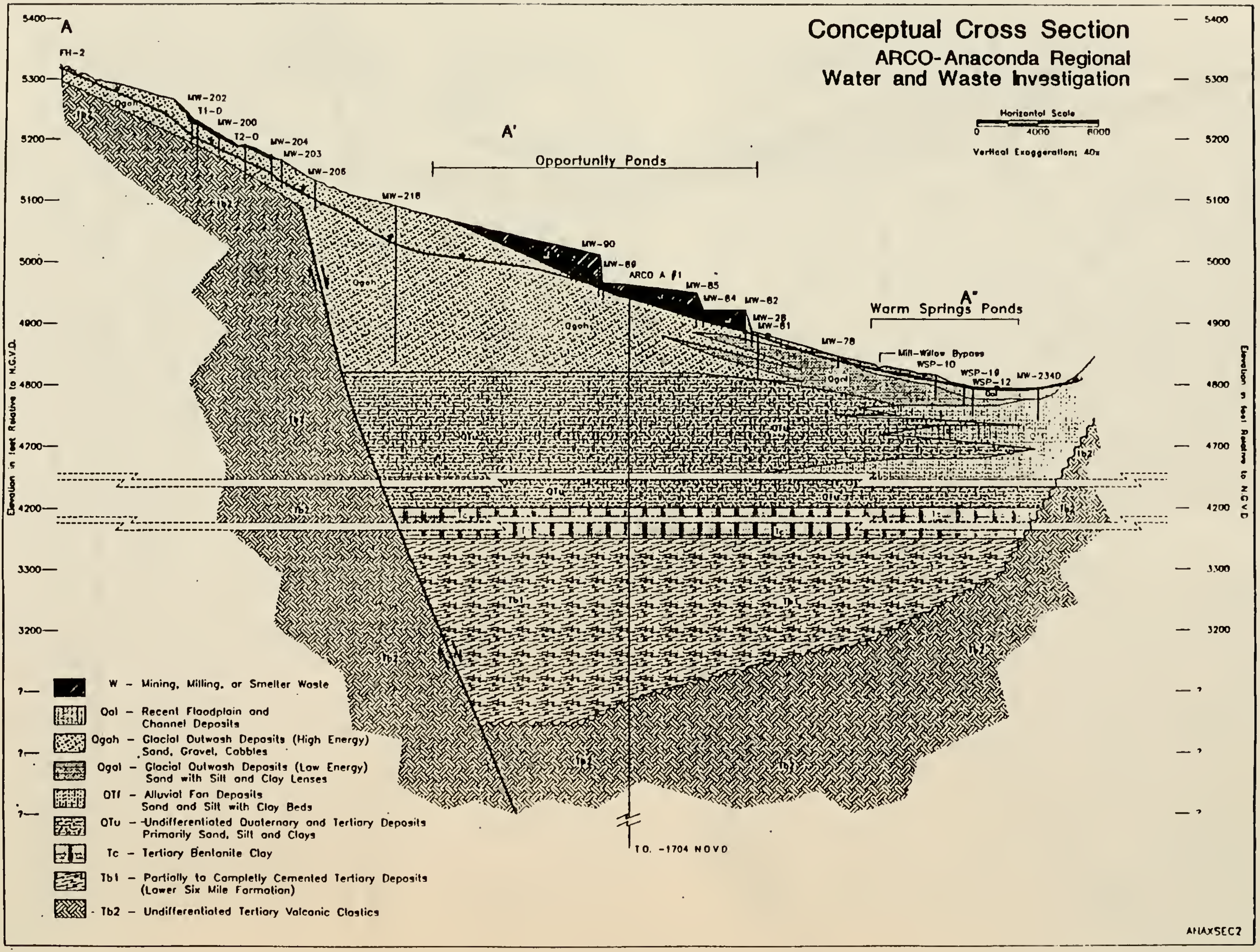

Conceptual Cross Section
ARCO-Anaconda Regional
Water and Waste Investigation
Horizontal Scale
0
4000
8000
Vertical Exaggeration: 40x
A
A'
A"
Opportunity Ponds
Warm Springs Ponds
Mill-Willow Bypass
FH-2
MW-202
T1-0
MW-200
T2-0
MW-204
MW-203
MW-206
MW-218
MW-90
MW-89
ARCO A #1
MW-85
MW-84
MW-82
MW-28
MW-81
MW-78
WSP-10
WSP-19
WSP-12
MW-2340
Qgoh
Qgol
Qal
QTu
Tc
Tb1
Tb2
T.D. -1704 NGVD
Elevation in feet Relative to N.G.V.D.
5400
5300
5200
5100
5000
4900
4800
4700
4200
3300
3200
?
W – Mining, Milling, or Smelter Waste
Qal – Recent Floodplain and Channel Deposits
Qgoh – Glacial Outwash Deposits (High Energy) Sand, Gravel, Cobbles
Qgol – Glacial Outwash Deposits (Low Energy) Sand with Silt and Clay Lenses
QTf – Alluvial Fan Deposits Sand and Silt with Clay Beds
QTu – Undifferentiated Quaternary and Tertiary Deposits Primarily Sand, Silt and Clays
Tc – Tertiary Bentonite Clay
Tb1 – Partially to Completly Cemented Tertiary Deposits (Lower Six Mile Formation)
Tb2 – Undifferentiated Tertiary Volcanic Clastics
ANAXSEC2

Figure 8: Conceptual cross section A-A" of the basin, west to east (ESE, 1992).

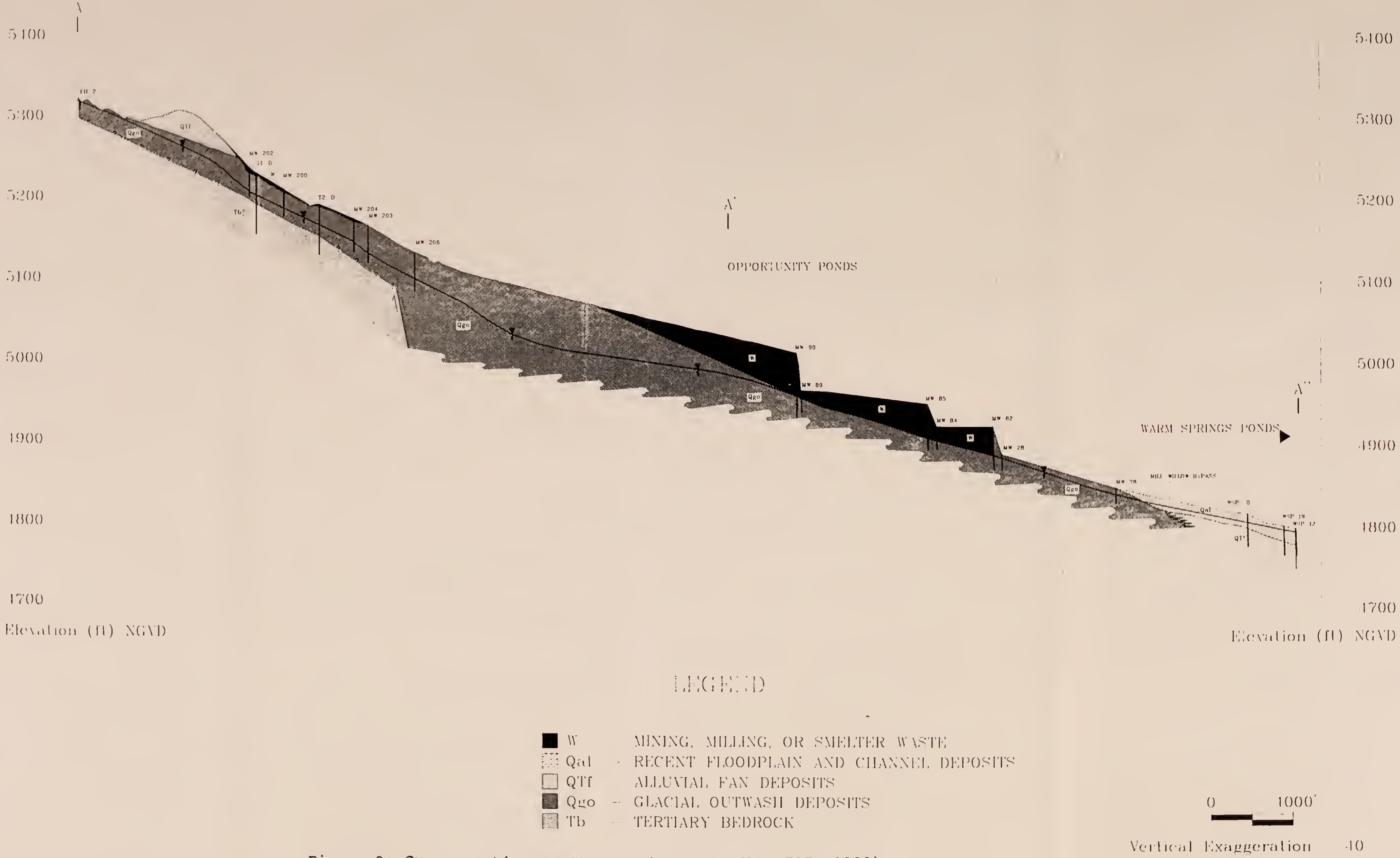


Figure 9: Cross section A-A", west to east(after ESE, 1992).

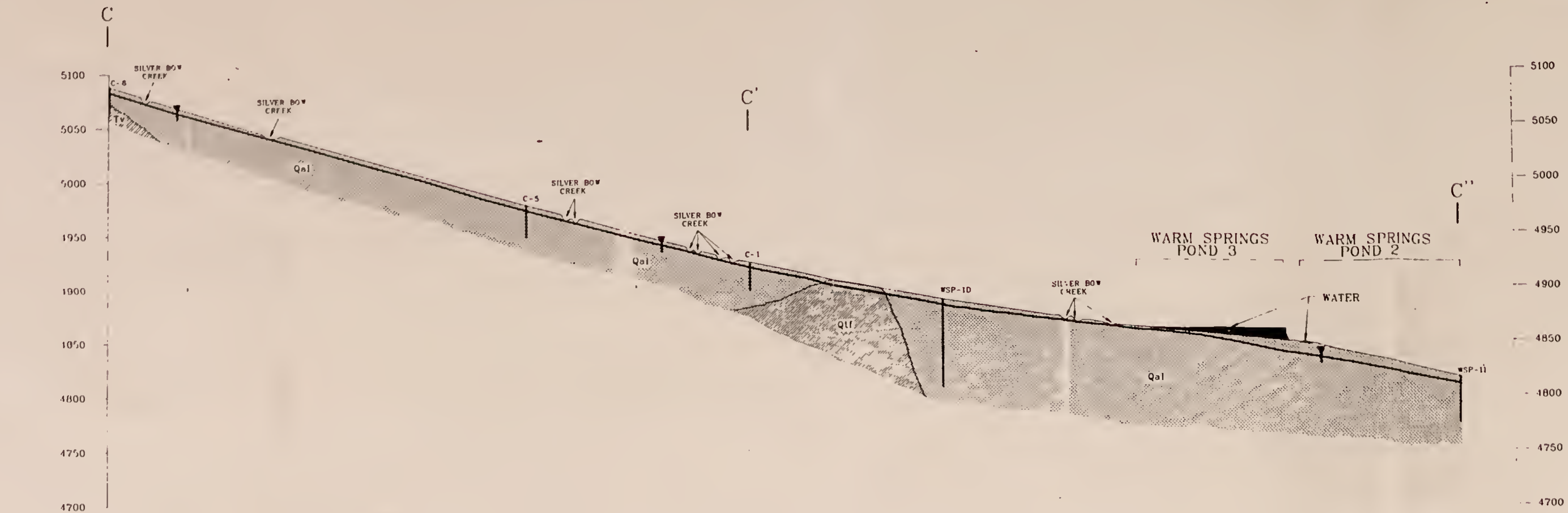


Figure 11: Cross section C-C", south to north (after ESE, 1992).

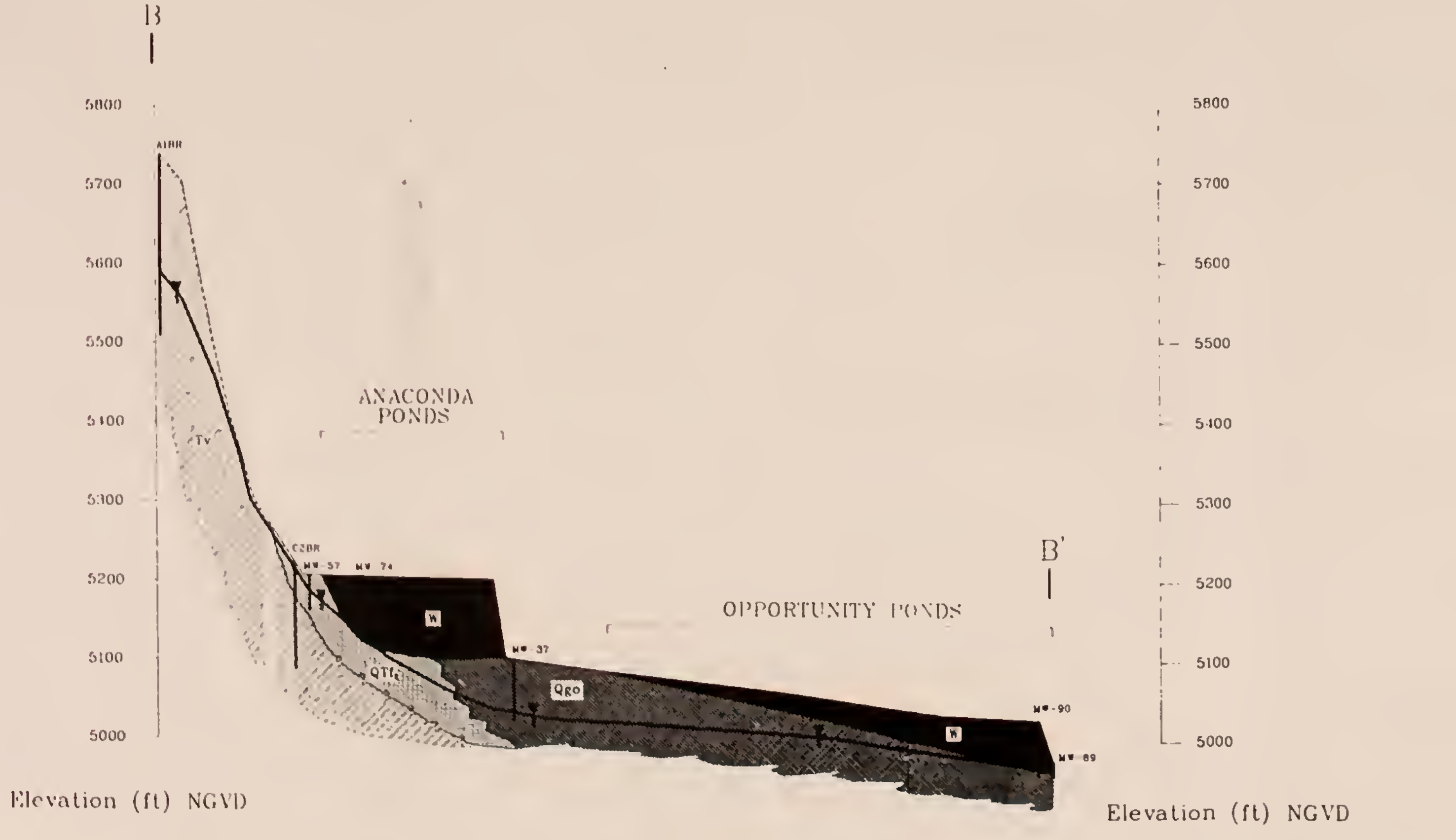


Figure 10: Cross section B-B', southwest to northeast (after ESE, 1992).

LEGEND

■	W	MINING, MILLING, OR SMELTER WASTE
▨	Qal	RECENT FLOODPLAIN AND CHANNEL DEPOSITS
▨	Qgo	GLACIAL OUTWASH DEPOSITS
▨	QTf	ALLUVIAL FAN DEPOSITS
▨	QTf_2	OLDER ALLUVIAL FAN DEPOSITS
▨	Tv	LOWLAND CREEK VOLCANICS, TUFF, BRECCIA, VOLCANOGENIC SEDIMENTS

EXHIBIT 2
ANACONDA REGIONAL CROSS-SECTIONS
B-B' AND C-C'-C''

PREPARED FOR ARCO	PREPARED BY. ESE	
DATE. 04/02/92	PROJECT # 6911218	SHT 1 OF 1
CHECKED LAP	DWG/FIG #	REV #
APPR BY:	SCALE. 1"=2000'	DWG SIZE. D

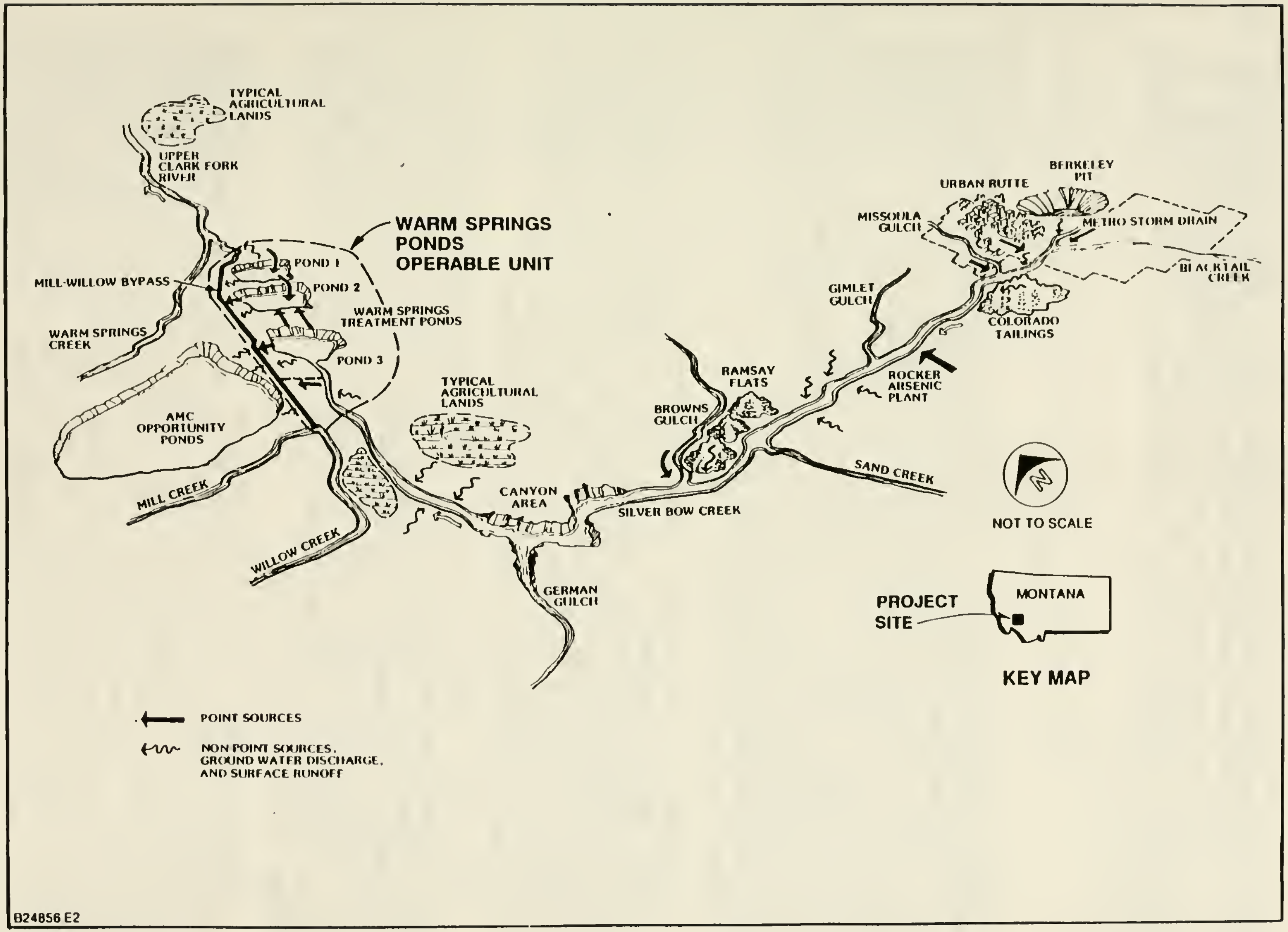


Figure 12: Warm Spring Ponds location map (MDHES and CH2M Hill, 1989)

Bypass just west of the Warm Springs Ponds was re-constructed during 1969 and 1970 to divert relatively uncontaminated water from Mill and Willow creeks around the ponds. Lost Creek located north of Warm Springs Creek had an average discharge of 62 cfs in 1993. Water from the Clark Fork River and its tributaries is diverted for irrigation through ditch and pump systems throughout most of the valley.

Hydrogeology

Groundwater occurs in Quaternary glacial outwash and floodplain deposits, underlying finer-grained Tertiary sediments and the adjacent bedrock of the southern portion of the Deer Lodge valley. Water supply wells are finished in Quaternary and Tertiary deposits, and, in some cases, jointly perforated in both deposits. Konizeski et al. (1962) report that adequate water for stock and domestic supply can be obtained from the near surface unconsolidated sediments. Wells finished in Quaternary and Tertiary sediments yield up to 1,200 gpm in the Mill Creek-Warm Springs alluvial plain areas (Konizeski et al., 1962). Formational properties have been calculated and estimated for alluvial deposits and bedrock by various studies (Table 1).

Recharge to the valley floor groundwater system originates from four major sources: 1) lateral groundwater flow from the bedrock mountains located to the west of the valley; 2) groundwater underflow from mountain stream and creek valleys; 3) losing reaches of stream channels and ditches flowing on the fans; 4) direct precipitation. Direct recharge from infiltration of precipitation through waste piles is a concern at this site and a number of attempts have been made to quantify this process.

TETRA TECH (1986) reported that preliminary infiltration studies conducted on the tailings ponds yielded values of 0 to 7 inches. They state that the average annual rate is more likely 2 to 5 inches. Geochemical modeling efforts used rates of 2 to 4 inches to represent annual recharge from pond surfaces (TETRA TECH, 1986). TETRA TECH (1986) also estimated a water balance for the Anaconda site that included about 2 cfs for pond to groundwater recharge or about 1450 acft/yr.

Recent studies of the recharge to Old Works, Anaconda and Opportunity Ponds, and Smelter Hill recognized recharge by precipitation occurs in these areas (ESE, 1994). The most vadose zone data were provided for the 1993 time period. Natural vegetated soils, waste piles in the Old Works area and soils in the Smelter Hill region received about 2 in of recharge in 1993. Opportunity and Anaconda Tailings ponds received 4 in and 7 in of recharge, respectively (Figures 13 and 14). ESE (1994) reports average annual recharge rates of 3.6 in for areas of bare soil, tailings, wastes and small impermeable areas classified as

TABLE 1: Hydraulic Properties of the Quaternary (Al.) Aquifer, Tertiary (Tr.) Aquifer and Bedrock (after TETRA TECH (1987), PTI (1991), ESE (1991) and ESE (1992)).

Property	Al. Aquifer	Tr. Aquifer	Volcanic Bedrock
Transmissivity	30-13,800 ft^2/d	2-200 ft^2/d	
Hydraulic Conductivity	50-1200 ft/d	0.2-27 ft/d	0.0004-16 ft/d (1.45 ft/d)*
Storage	20%-25%	-	
Porosity	20%-25%	-	

* ESE (1994) reported average

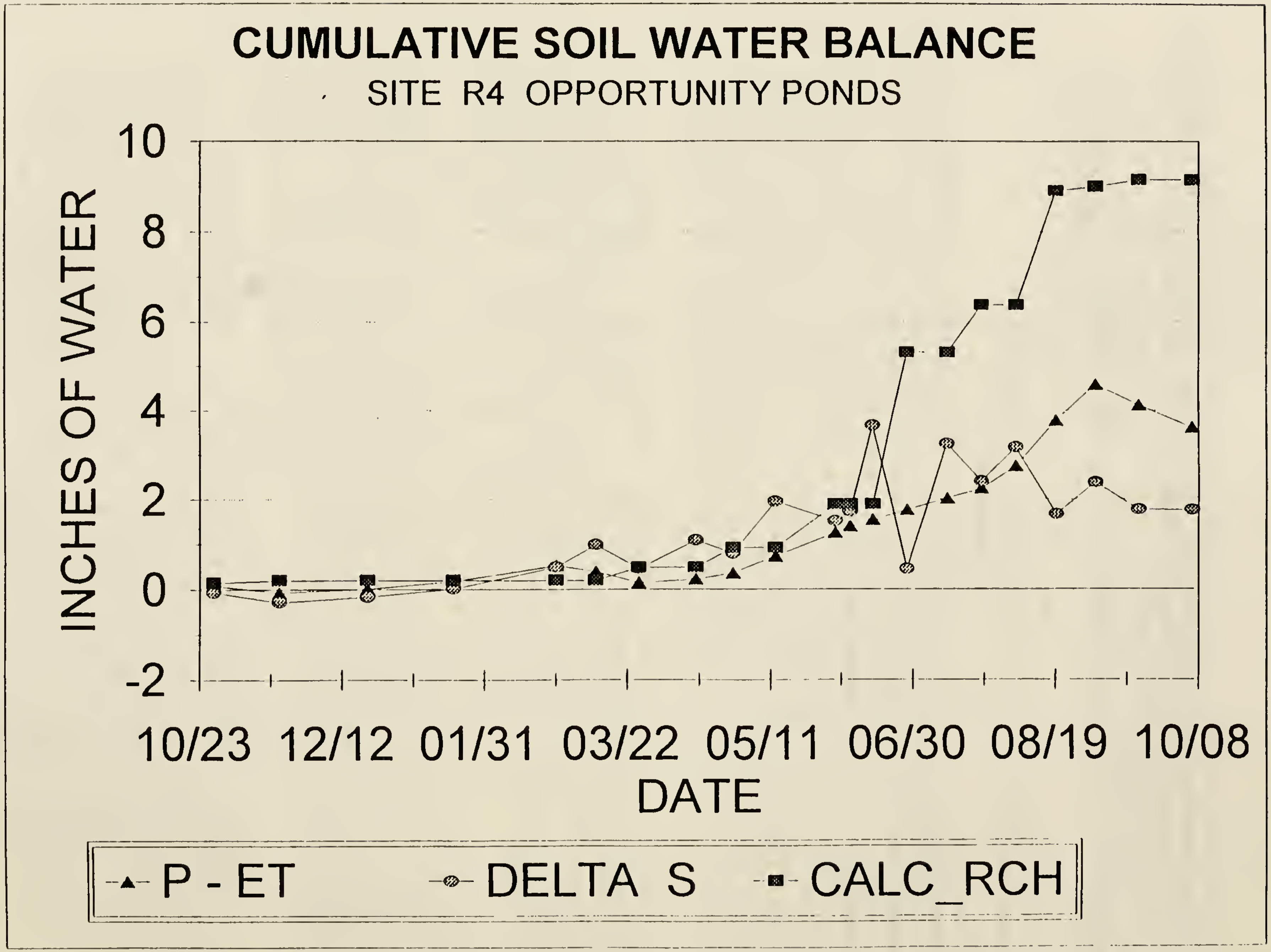


Figure 13: Cumulative soil water balance for site R4 at Opportunity Ponds P-ET value considered recharge to groundwater (ESE, 1994).

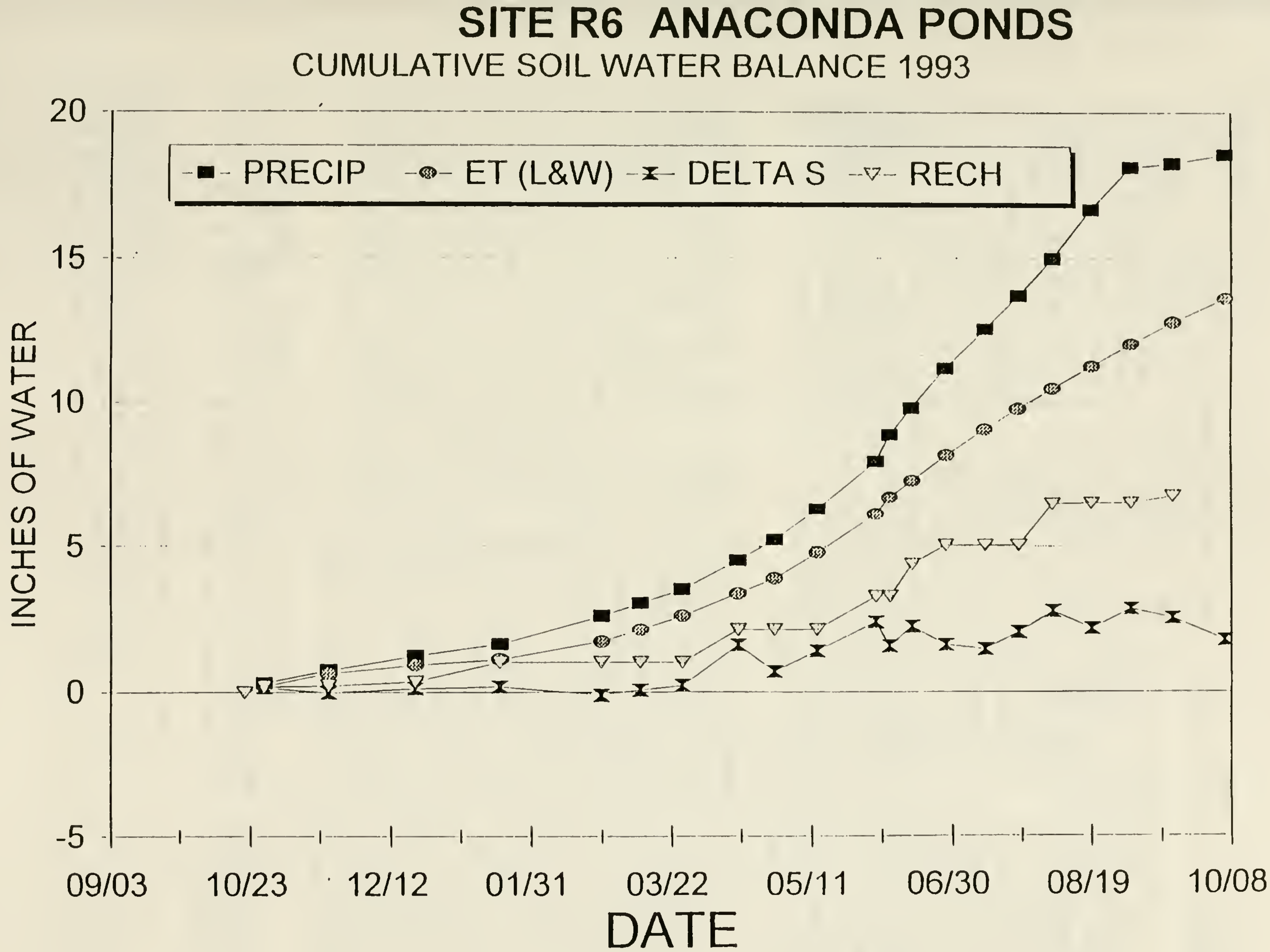


Figure 14: Cumulative soil water balance for site R5 at Anaconda Ponds P-ET value considered recharge to groundwater (ESE, 1994).

industrial areas. Annual recharge volumes contributed from the extensive tailings ponds areas are estimated in Table 2.

These rates are further supported by Hanks and Ashcroft (1980) who have evaluated bare soil- soil moisture balances on agricultural lands. They state that in regions where summer fallow (bare soil) is practiced, about 30% of the annual precipitation is preserved for plant use. When thirty per cent of the mean annual precipitation rate of 13.8 in (ESE, 1994) is used to estimate recharge to waste piles and ponds, about four inches of precipitation annually would become recharge. However site conditions at Anaconda may attribute to larger recharge rates. On the average, 4.5 in of precipitation (based on 1982 to 1989 precipitation records for Anaconda) falls between October and the end of April. Temperatures are near freezing during much of this period and evaporation is most likely negligible. Thus, when spring rains and snowmelt occurs, most of this water would infiltrate the un-vegetated deposits and recharge the groundwater system, making the total quantity of water available to recharge the groundwater system greater than that calculated solely from annual precipitation rates.

The groundwater system discharges to the Clark Fork River and generally, to the lower reaches (below the approximate surface elevation of 5,000 ft) of creek channels and ditches (ESE, 1994). Groundwater flow, as interpreted from water table elevations measured in wells tapping both the Quaternary and Tertiary deposits, moves from southwest to northeast (Figure 15, 16 and 17). Nests of wells in the area show strong downward vertical gradients on Smelter Hill and upward gradients at its base just west of Anaconda Ponds (Table 3). Upward gradients were also observed in the vicinity of T1 and T2 well nests adjacent to Warm Springs Creek just north of the town of Anaconda. Groundwater in the majority of the valley floor sediments, including the area overlain by the Anaconda and Opportunity tailings ponds has the potential to migrate downward into the underlying sediments. Groundwater flow in the vicinity of Warm Springs Ponds is generally from the ponds northward (Figure 17). Some water also flows westward through the pond berms and discharges to Mill-Willow By-Pass. Upward vertical gradients are found down gradient from Warm Springs Ponds and along the Clark Fork River (ESE, 1994).

Groundwater velocities in sand and gravel sediments are estimated to range from 650 to 3,650 ft/yr (TETRA TECH, 1987). The approximate position of the water table with respect to waste deposits in the Anaconda area is indicated on Figures 9 to 11.

It should also be noted that until 1982, historically dry portions of Opportunity ponds were watered down to control dust (TETRA TECH, 1987). This action and large quantities of water slurried tailings wastes disposed of in the ponds in the past certainly increased pond recharge rates from those estimated from conditions today.

TABLE 2: Annual Flux of Recharge Water though the Anaconda and Opportunity Ponds.

Pond	Area (ac)	Recharge Range* (in/yr)	Recharge Flux (acft/yr)
Anaconda	560**	3.6-7	170- 330
Opportunity	3,400	3.6-4	1,020-1,130
TOTAL	3,960		1,190-1,460

*Range estimated as the regional annual average and the 1993 derived value (ESE, 1994).

** ARCO disclosure, 1994, area of 700 ac.

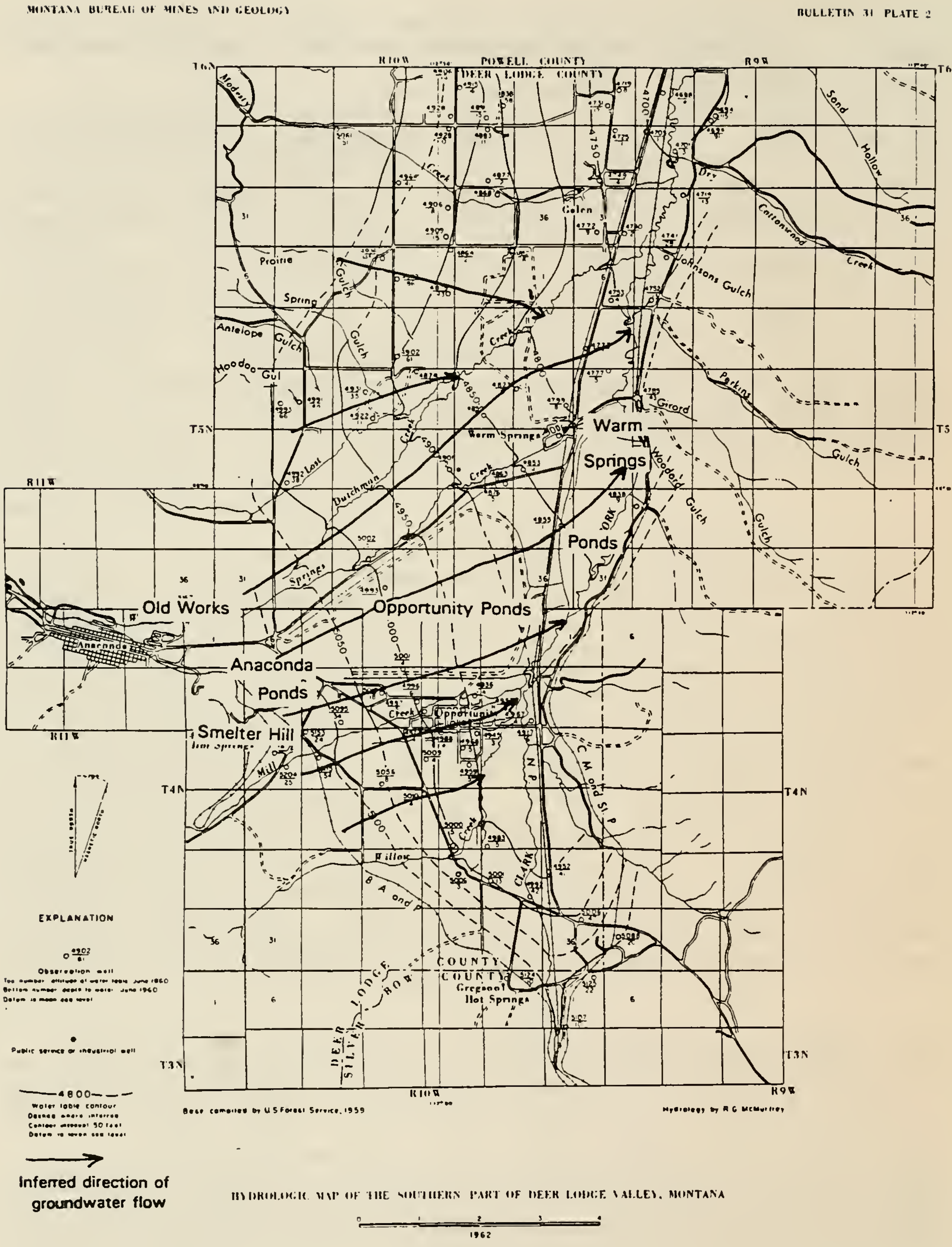


Figure 15: Water table map for the southern portion of the Deer Lodge Valley. Arrows indicate the general direction of groundwater flow (modified from Konizeski et al., 1962).

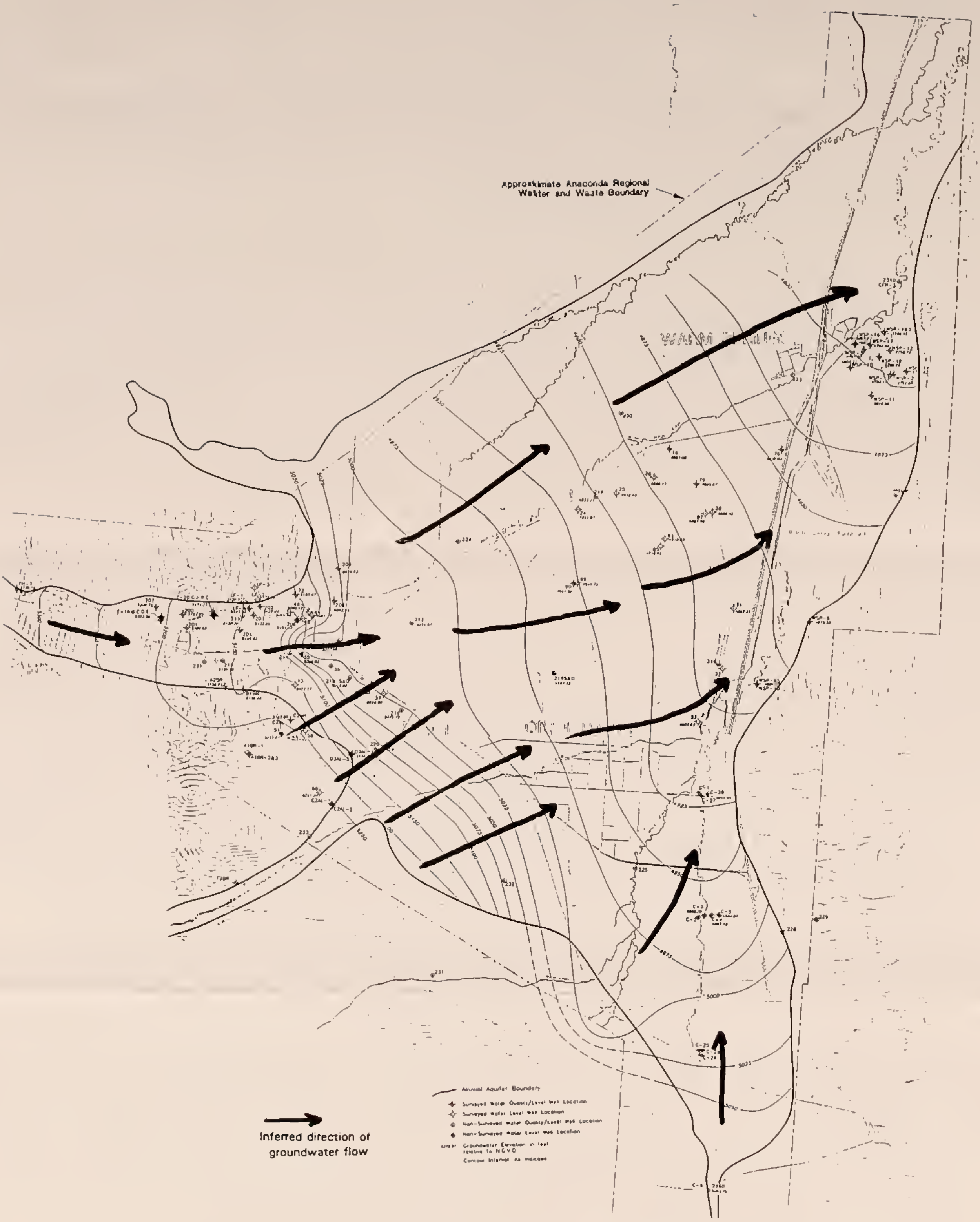

Approximate Anaconda Regional Water and Waste Boundary
Alluvial Aquifer Boundary
Surveyed Water Quality/Level Well Location
Surveyed Water Level Well Location
Non-Surveyed Water Quality/Level Well Location
Non-Surveyed Water Level Well Location
Groundwater Elevation in feet relative to NGVD
Contour Interval As Indicated
Inferred direction of groundwater flow
5000
5025
5050

Figure 16: Water table map for the Anaconda region June, 1992
Arrows indicate the general direction of groundwater flow (modified from ARCO, 1993).

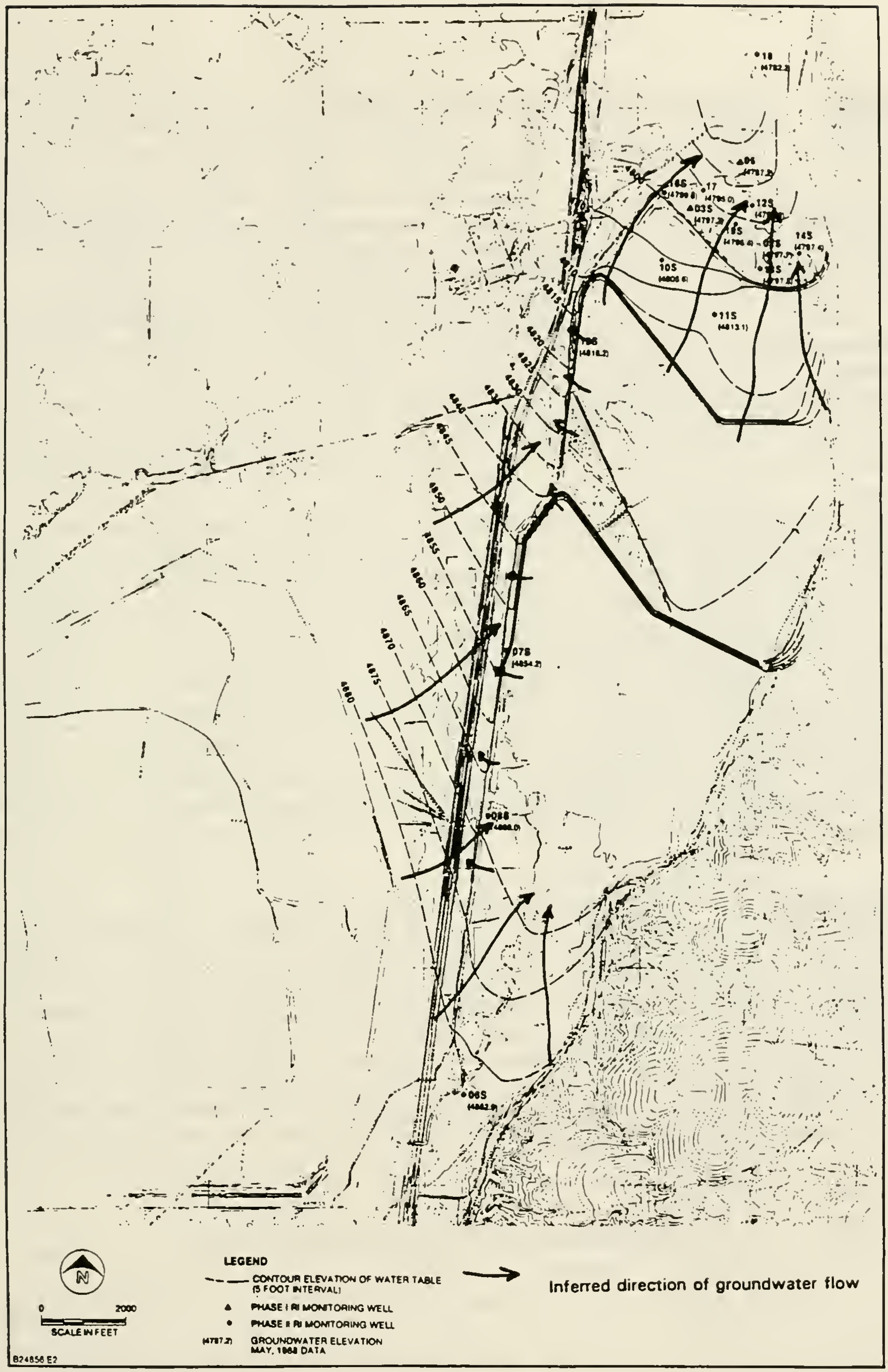


Figure 17: Water table map and inferred flow directions for May, 1988, in the vicinity of Warm Springs Ponds (after MDHES and CH2M Hill, 1989)

TABLE 3: Nested Well Data -September 1992 and June, 1993 (ESE, 1994).

Location	Well ID (s&d)	Well Completion Unit	Screened Interval Elevation Difference (ft)	September 1992 - Downward + Upward Vertical Head Difference (ft)	September 1992 Gradient (i)	June 1993 - Downward + Upward Vertical Head Difference (ft)	June 1993 Gradient (i)
Old Works	T1-E (s) T1-D (d)	Qgo (s) QTf2 (d)	40.5	+0.14	+.0035	+0.12	+.0030
	T2-C (s) T2-D (d)	Qgo (s) Tlv (d)	27.5	+0.09	+.0033	+0.22	+.008
Smelter Hill	A1BR-2 (s) A1BR-3 (d)	Tlvl (s&d)	67	-66.49	-.99	-66.2	-.99
	C2AL (s) C2BR (d)	Tlv (s&d)	49	+0.26	+.0053	+0.29	+.0059
	D3AL-1 (s) D3AL-3 (d)	QTf2 (s&d)	134	+33.5	+.25	+34.1	+.25
	E2AL-1 (s) E2AL-2 (d)	QTf2 (s&d)	147	-29.83	-.20	-28.07	-.19
Opportunity Ponds	215 (s) 81 (d)	Qgo (s) QTf2 (d)	67	-2.28	-.034	-2.93	-.044
	217s 217d	Qgo (s) QTf2 (d)	84	-6.14	-.073	-6.18	-.074
	212 (s) AWP-2 (d)	Qgo (s&d)	178.5	NA	NA	-5.25	-.029
Anaconda Ponds	218s 218d	Qgo (s&d)	167.5	-2.75	-.016	-1.68	-.010
South Study Boundary	C-6 (s) 226d	Qal (s) Tlv (d)	26.5	-0.11	-.0042	-0.03	-.0011
North Study Boundary	CFR-3 (s) 234d	Qal (s) QTf2 (d)	46.5	+0.58	+.012	+0.28	+.0060
Warm Springs Ponds	WSP-6s WSP-1d	Qal (s&d)	63	+1.56	+.025	+0.33	+.0052
	WSP-5 (s) WSP-4 (d)	Qal (s&d)	18	+0.44	+.024	+0.39	+.022
Anaconda Airport	AWO-4 (s) AWP-1 (d)	Qgo (s&d)	187	NA	NA	-3.23	-.017
	OD-2s OD-2d	Qgo (s&d)	24	NA	NA	-0.42	-.018
	OD-3s OD-3d	Qgo (s&d)	21	NA	NA	-0.85	-.040

Note: Screened interval elevation difference is calculated based on the midpoints of the screened intervals.

During operation of the Anaconda Smelter site large volumes of water were used in the processing and disposal of wastes. Portions of this water infiltrated waste ponds, bedrock, and creeks and canals, most likely altering groundwater flow directions and water table positions seen today. Estimates of the historic waste stream at the Anaconda site indicate at least 17.4 million gallons per day (53 acft/d) of waste water was being used on Smelter Hill (Figure 18). Over 3.8 million gallons per day (11.7 acft/d) entered Anaconda Ponds and a waste stream of over 30.1 million gallons per day (92.4 acft/d) flowed into Opportunity ponds (assumes the tailings slurry is 50% water). Estimates of annual discharges are presented in Table 4. Though the flow chart presented in Figure 15 indicates all water entering Anaconda and Opportunity ponds exits, this is highly unlikely, as the tailings are permeable and most likely large quantities of water infiltrated the wastes and recharged the underlying groundwater.

The addition of water to the valley groundwater system undoubtedly altered flow directions as groundwater mounds formed beneath areas of concentrated recharge. Groundwater from these sites would have tended to move radially outward and downward. The resulting rise in the water table would have also effected the interaction of streams and ditches with the groundwater system, lengthening reaches receiving groundwater discharge. This is supported by large water table declines observed in the tailings following smelter shut down (TETRA TECH, 1987) (Figures 19 and 20). However, Similar water level trends most likely occurred in the Smelter Hill groundwater system, increasing the lateral flow of groundwater from the bedrock to the adjacent valley fill aquifer. Thus, artificial recharge of the groundwater system occurred for almost 100 years.

Recent work by ESE (1994) compared the 1992 water table elevation beneath Opportunity Ponds with 1985 water level data and found a decline in the water table of from 1 to 15 ft in the vicinity of cells C1 and C2 (Figure 21). Interestingly, when the 1992 water table position was compared to the water table elevation in the following year, the wetter than average 1993, water levels rose from 1 to 15 ft in the general area in which they declined between 1985 and 1992 (Figure 22). The first period is one in which precipitation was below normal. Possibly these two sets indicate mound decline has ceased in the Opportunity Ponds area.

GROUNDWATER INJURY DETERMINATION

Source

Hazardous substances found at the Anaconda site are associated with the processing of copper ore and the concentration of associated by-products. Principal hazardous constituents of the wastes are arsenic and heavy metals. Wastes have been entering the

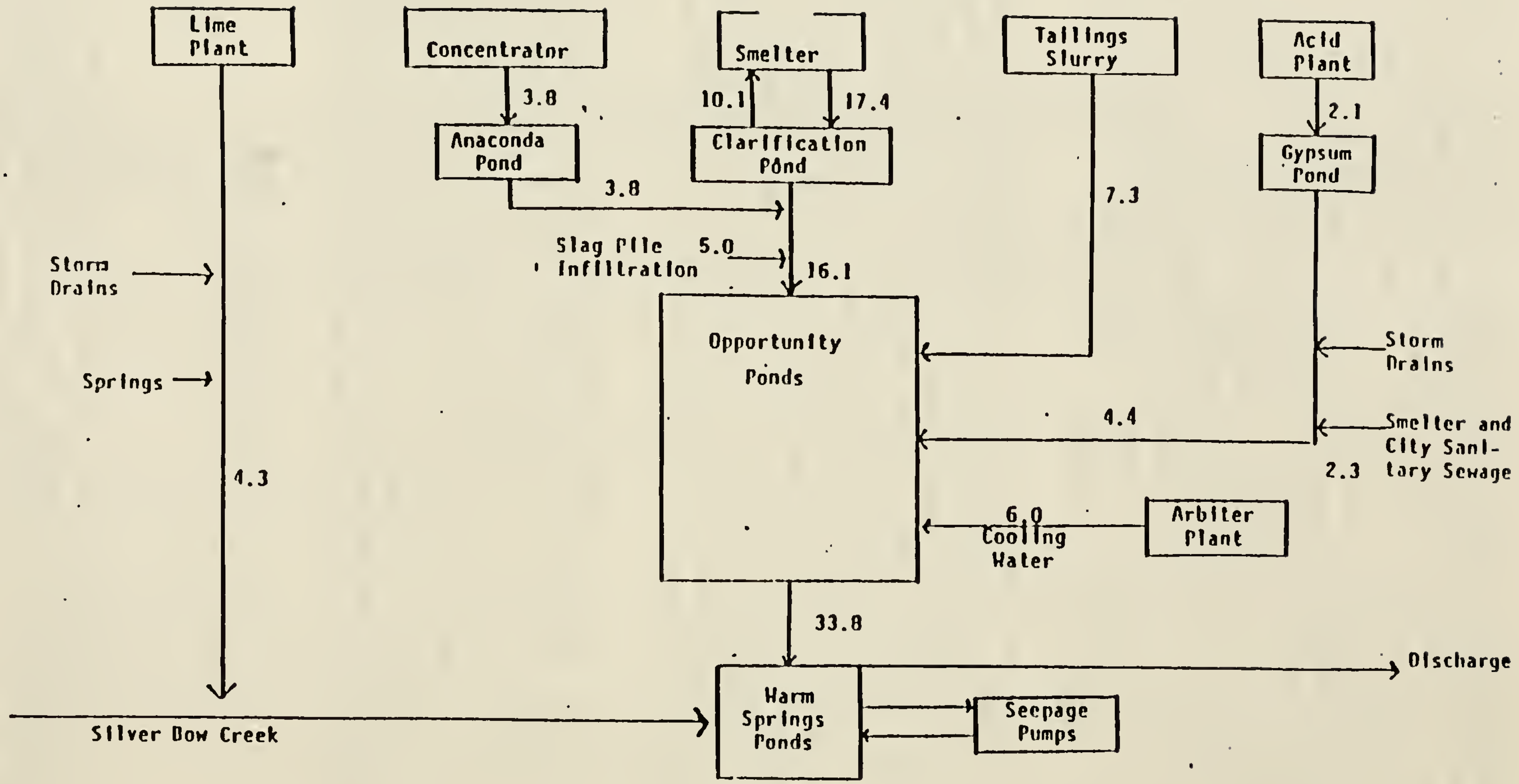


Figure 18: Historic water and waste streams associated with smelting at Anaconda, values in million of gallons/day (E&E, 1982)

TABLE 4: Historic Waste Stream Flows on Smelter Hill and into Anaconda and Opportunity Ponds during Smelter Operation (after E&E, 1982).

Site	Flows (acft/yr)
Smelter Hill	19,345
Anaconda Ponds	4,270
Opportunity Ponds	33,726

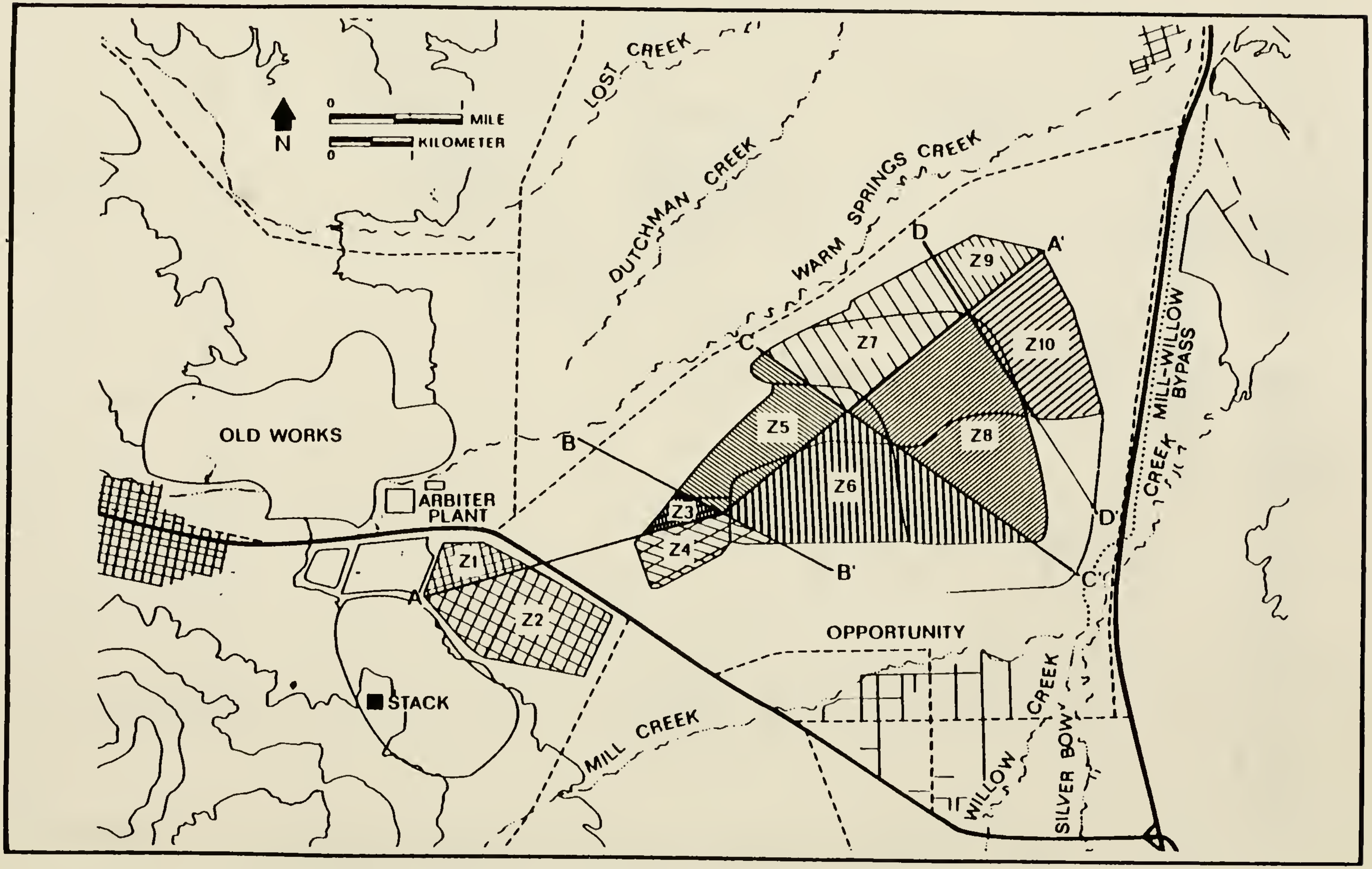
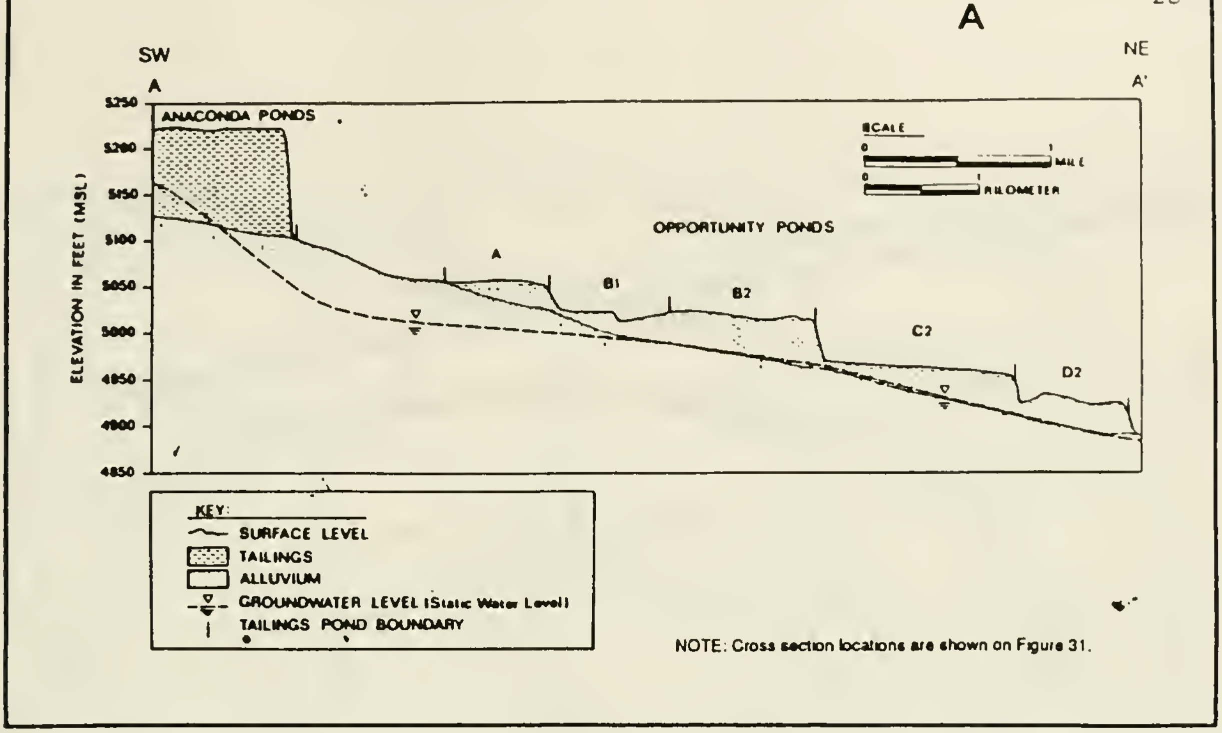
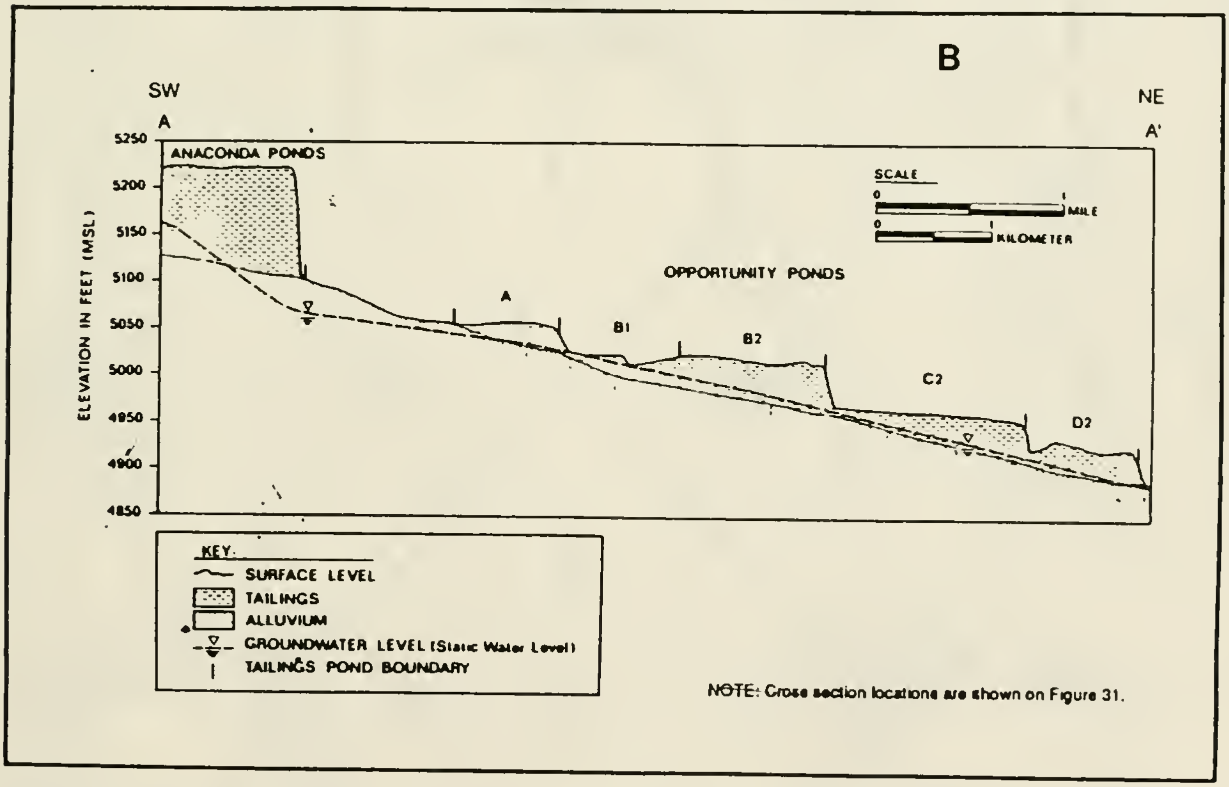


Figure 19: Location of cross section A-A' presented by TETRA TECH (1987).



NOTE: Cross section locations are shown on Figure 31.

Current groundwater level and tailings ponds profile.



NOTE: Cross section locations are shown on Figure 31.

Figure 20: Position of the water table in cross section A-A'in 1985 (A) and the maximum position of the water table in 1974 (B)(based on August, 1975, measurements at wells 36, 16, 19, and 28) (after TETRA TECH, 1987).

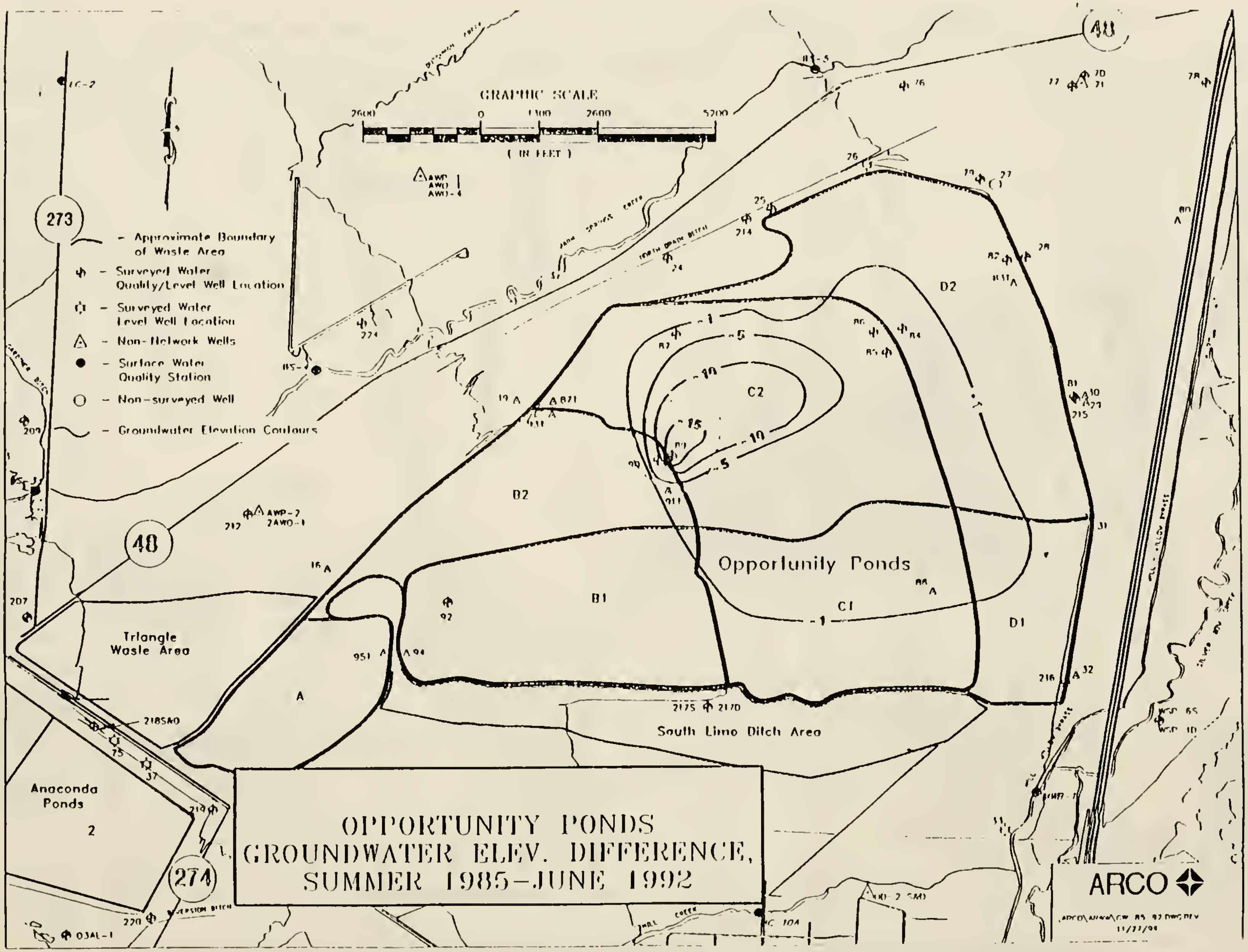


Figure 21: Groundwater elevation difference (ft) summer 1985 - June, 1992, Opportunity Ponds (ESE, 1994).

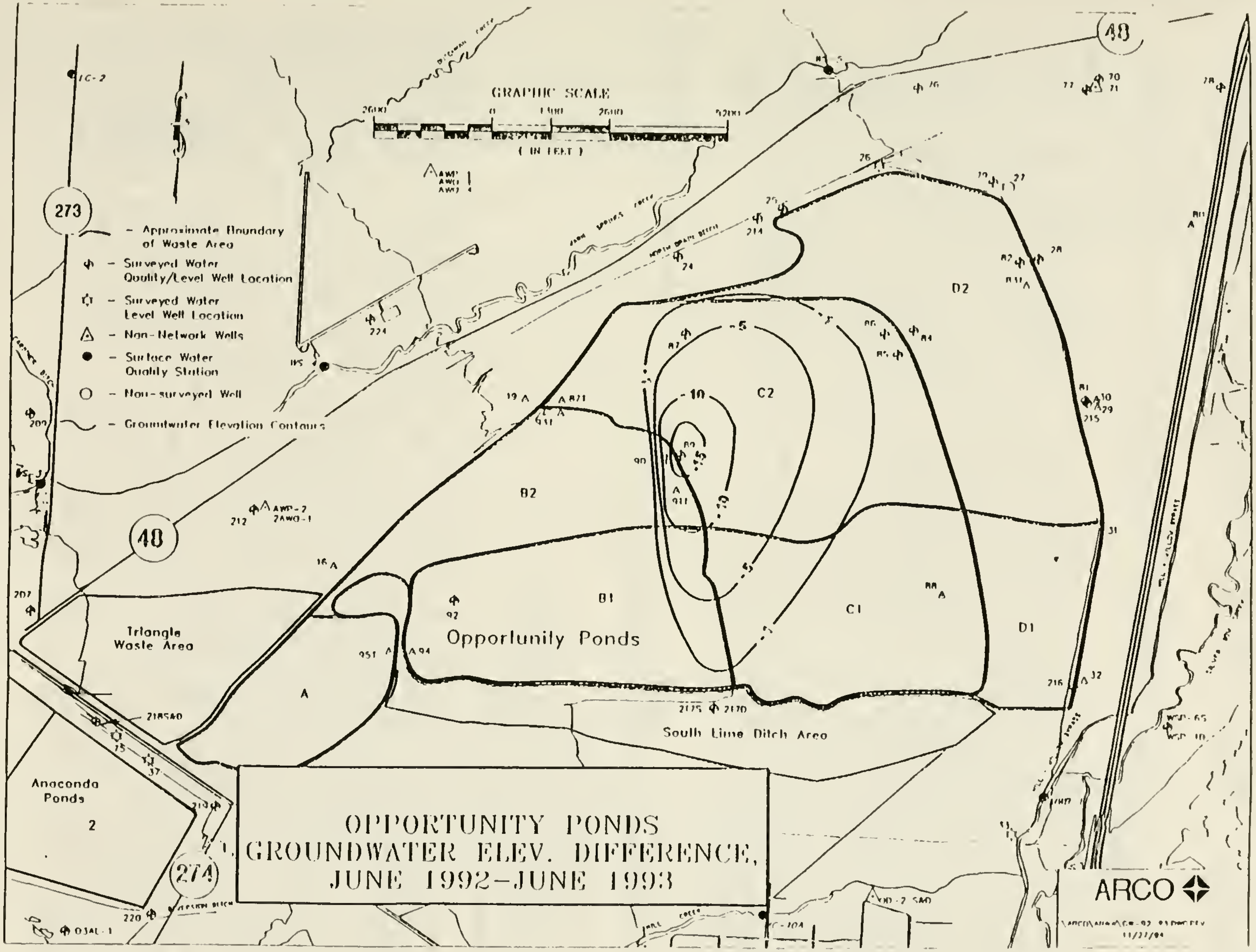


Figure 22: Groundwater elevation difference (ft) June 1992 - June, 1993, Opportunity Ponds (ESE, 1994).

hydrogeologic environment since 1884 when smelting operations began at the Old Works Site north of the town of Anaconda (Figure 2). More than 15 square miles of multiple waste sites have created groundwater contamination in the past and continue to do so today.

Site History: Frequency and Duration of Waste (Source) Production

A time line prepared by TETRA TECH (1987) shows that ore processing began in the Anaconda area in 1884 (Table 5). The copper ores mined in Butte were first processed at the Upper Old Works north of the current town of Anaconda (Figures 1 and 2). The Lower Old Works became operational in 1886. The Old Works shut down in 1903 as the higher-capacity Washoe (New) Works (later known as the Anaconda Reduction Works) began operation on Smelter Hill (Figure 2). After 1961, concentrating operations were moved to Butte and thereafter very few tailings were reported to be produced and disposed of in the Anaconda and Opportunity tailings ponds. Copper was processed with an ammonia-leach extraction process at the Arbiter plant in the mid-1970's. The Anaconda Reduction Works was closed in September, 1980. Between 1982 and 1985 the Cleveland Wrecking Company salvaged materials and equipment from Smelter Hill and demolished all the structures except the smelter stack (TETRA TECH, 1987).

Wastes left behind by the ore processing operations in the Anaconda area include those found at the:

1) Old Works site;
2) Smelter Hill;
3) Anaconda tailings ponds;
4) Opportunity tailings ponds;
5) Warm Springs Ponds.

Groundwater contamination has been directly linked to wastes associated with the Old Works Site, Smelter Hill, the Anaconda and Opportunity tailings ponds and Warm Springs Ponds. Silver Bow Creek and other tributaries of the Clark Fork River were used for direct waste disposal from mining operations, most noticeably those that occurred in Butte. Investigations of shallow groundwater adjacent to the Yellow Ditch near well 232, and in the area of the Yellow Ditch and Blue Lagoon near well 235 have revealed contaminated water and soils (Figure 1 and 2, Plate 1) (ESE, 1994). Silver Bow Creek was dammed starting in about 1918 to create the Warm Spring Ponds which were used to treat and settle mining and smelting wastes. Since construction of the ponds, metal-rich sediments have collected and groundwater contaminated with metals and arsenic has emanated from the ponds. Additional deposits of tailings are found in the floodplain of Silver Bow Creek, Mill Creek, Willow Creek, Warm Springs Creek, the Mill-Willow Creek Bypass, and the Clark Fork River.

TABLE 5: Anaconda Smelter Site Time Line (TETRA TECH, 1987).

1884	Upper Old Works begins operations
	25 reverberatory furnaces with individual stacks
	500 tons of ore per day capacity
1886	Upper Old Works capacity doubled to 1,000 tons of ore per day
	All furnaces connected via a single flue to 200-ft stack on hillside
1888	Lower Old Works begins operations
	29 reverberatory furnaces connected via flues to three stacks on hillside
	800 tons of ore per day capacity
1889	Lower Old Works destroyed by fire and rebuilt
	Total capacity of Old Works = 4,000 tons of ore per day
1890	Converter plant built between Upper and Lower Old Works
1894	Second converter built east of Lower Old Works connected to single stack on hillside
1902	Washoe (New) Smelter begins operation
	14 furnaces, 12,000 tons of ore per day capacity
	Roasters, blast furnaces, and converters each connected by flues to four separate stacks
1903	Upper and Lower Old Works closed down
	New flue system installed and connected to single, 300-ft stack
1918	Cottrell electrostatic precipitators installed on main flue
	Precipitator dust sent to arsenic recovery plant
1919	New 585-ft stack completed on main flue
1924	Selective flotation process begins operation
	Reduced volume and temperature of flue gases entering Cottrells allows increased recovery of flue dust and reduces SO_2 emissions
1942- 1969	Three H_2SO_4 production plants built
1951	Concentrate brought in from Weed concentrator in Butte
	Washoe concentrator use becomes intermittent
1964	Arsenic recovery plant closed down
	1,000 tons of flue dust per month shipped to ASARCO plant in Tacoma, WA
1971	Steel balloon flue built
	Gas and dust collection improved
	Spray chambers built
	Temperature control of flue gas improved
1972	Flue dust shipments to ASARCO cease
1973	Acid plant built
	SO_2 emissions reduced
1974- 1977	Arbiter plant in operation
1975	Baghouse dust collector built
	Particulates emissions reduced
	Converter hoods built
	Fugitive gas emissions reduced
1976	New flue built from electric furnace to baghouse
1977	Reverberatory furnaces closed down
	Two maintained on standby status
	Cottrells closed down
1980	Washoe Smelter closed

Identity of Contaminants: Sources, Concentrations and Volumes

A description of the sources by site follows.

Old Works

Waste piles identified at the Old Works are shown in Figures 23 and 24. The wastes include flue waste, waste piles, heap roast slag piles, red sands waste, waste ponds, mixed slag, wastes and disturbed soils, and tailings. To determine the volume and surface area of waste deposits, selected Old Works waste piles were surveyed a number of times. Estimated surface area and volumes of the waste piles are presented in Table 6. Over 1.3 million cubic yards of waste are present in the Old Works Area. These wastes are characterized by high concentrations of arsenic, cadmium, copper, lead, zinc and other contaminants (Table 7). Statistical summaries of selected waste chemistry for samples taken from each major waste area are presented in Appendix A. The majority of the wastes were consolidated and/or covered with clean fill in 1994.

Smelter Hill

The Washoe Smelter was in operation on Smelter Hill from 1903 until 1980 (Figure 2). The smelter used large volumes of cooling water and over 185 million cubic yards of tails were slurried from the site (ESE , 1994). The smelter facilities were dismantled in the early 1980's and some reclamation work has taken place at the site. Investigations of the Smelter site have found elevated concentrations of arsenic, cadmium, copper, lead, zinc and other contaminants in the undisturbed and disturbed soil areas shown in Figure 25. This includes 27 million cubic yards of furnace slag and 657,000 cubic yards of flue dusts. Flue dust contains 65,300 mg/kg arsenic, 1,220 mg/kg cadmium, 13,000 mg/kg lead and 20,500 mg/kg zinc. Tables of metal concentrations found at and near the surface in the area are presented in Appendix B. Flue dust was treated and then placed in a repository on Smelter Hill during 1992 and 1993.

Anaconda and Opportunity Ponds

Locations of the Anaconda and Opportunity Ponds are shown in Figure 2. The calculated waste volumes and surface areas are given in Table 8. These calculations are based on planimetry and borehole data. The volume of waste materials in the Anaconda and Opportunity Ponds is approximately 240 times that of Old Works waste materials, over 243 million cubic yards (TETRA TECH, 1987).

The locations of sampling points in the Anaconda and Opportunity Ponds are shown in Figure 26. Solid phase data from these locations were used to characterize the wastes. The boreholes sampled ranged in depth from 21 to 93 ft (TETRA TECH, 1987).

Pond-wide tailings chemistry data for selected variables are summarized in Table 9. Borings and sampling revealed two principal

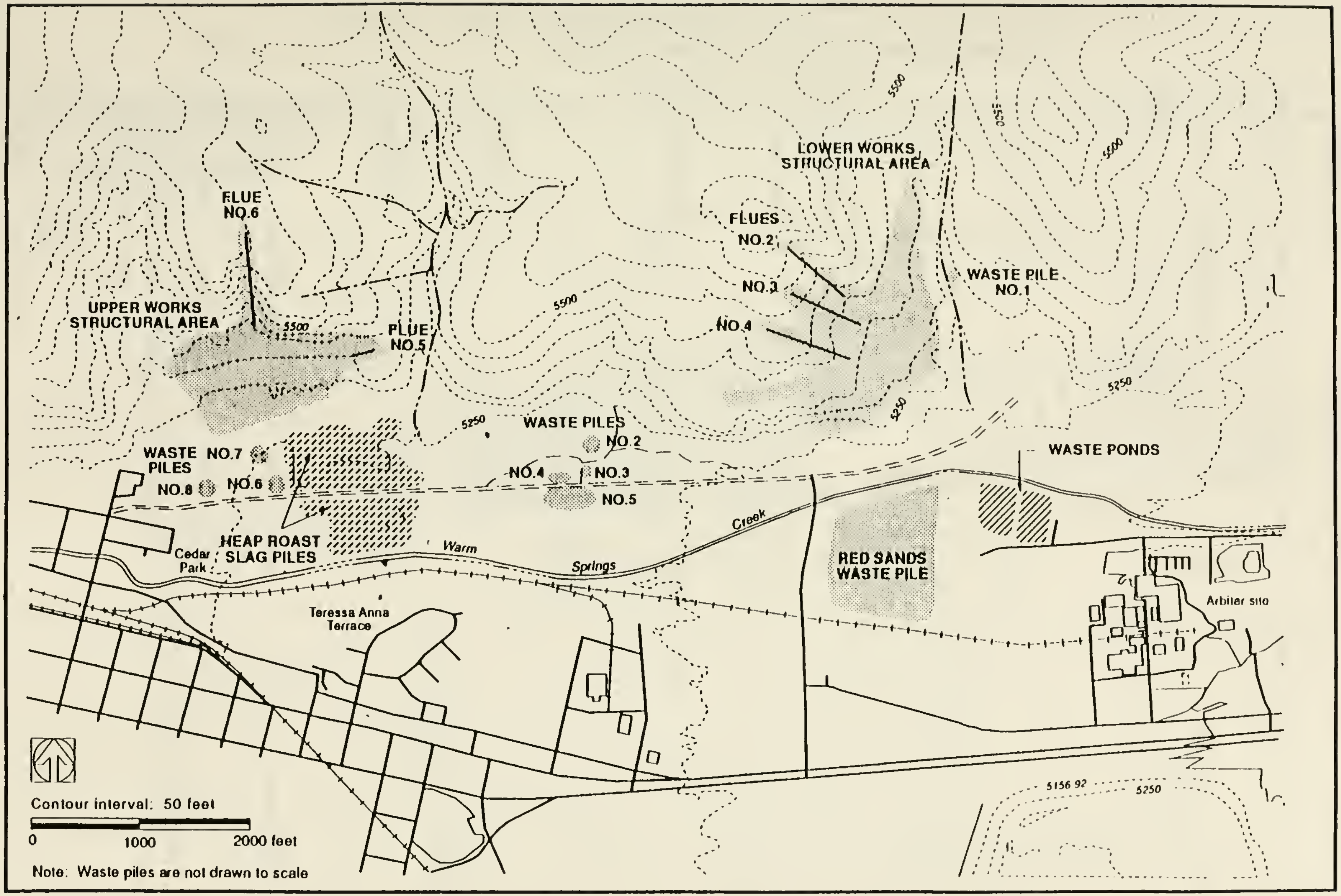


Figure 23: Locations of wastes sources associated with the Old Works Smelting sites (PTI, 1991).

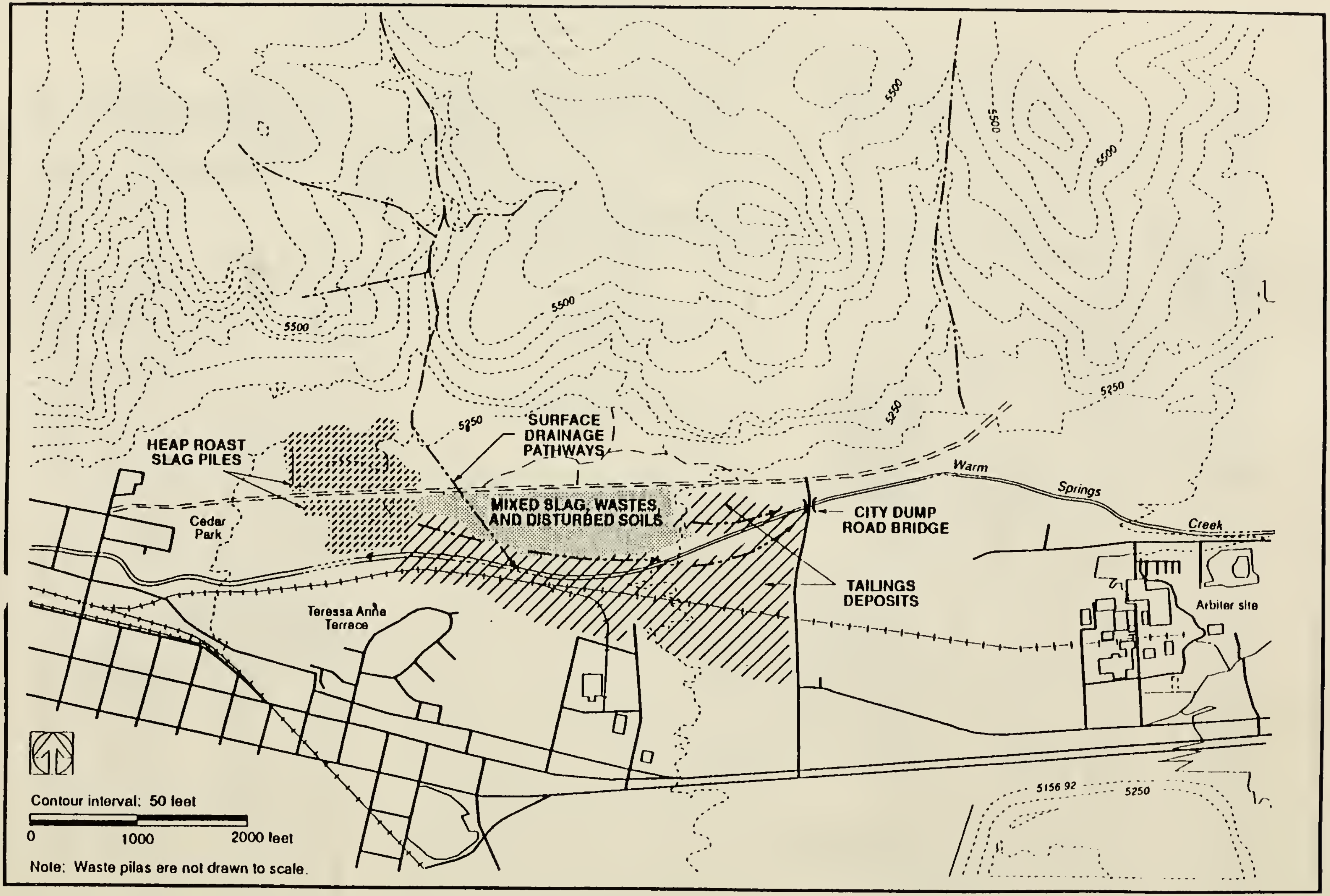


Figure 24: Location of floodplain wastes sources associated with the Old Works area (PTI, 1991).

TABLE 6: Summary of Old Works Waste Volumes and Areas (PTI, 1991).

Site	Feature	Surface Area (acres)	Volume (cubic varos)
Waste Piles	Waste Pile No. 1	0.19	3,950
	Waste Pile No. 2	0.44	2,850
	Waste Pile No. 3	0.09	640
	Waste Pile No. 4	0.11	920
	Waste Pile No. 5	2.88	19,970
	Waste Pile No. 6	0.05	310
	Waste Pile No. 7	0.22	2,320
	Waste Pile No. 8	0.15	820
	Total	4.13	31,780
Upper and Lower Works Structural Areas	--	NC[a]	NC
Heap roast slag	Northern heap roast slag pile	7.04	174,830
	Southern heap roast slag pile	6.43	123,560
	Total	13.47	298,390
Floodplain wastes	Wastes in modified 100-year floodplain	NC	256,500
	Total wastes in study area[b]		
	- Jig tailings	71.8	NC
	- Heap roast slag[c]	8.3	NC
	- Mixed waste and soil	20.3	NC
	- Total	100.4	440,000
Red sands	Above ground level	21.0	283,700
	Below ground level	NC	323,000
	Total	21.0	606,700
Waste ponds	West and East pond	5.47	8,050
Flues	Flue Nos. 1-6	NC	NC
	Total[d]	136	1,384,920

[a] Not calculated.

[b] Includes the southern heap roast slag pile and adjacent dispersed surface slag.

[c] Includes the area between Cedar Street and the city dump road; excludes waste piles.

[d] Sum of total wastes in floodplain, Red Sands, Waste Piles 1-8, heap roast slag piles, and the waste ponds.

TABLE 7: Comparison of Geometric Mean Concentrations of Metals and pH in Waste Materials (ESE, 1994).

	Arsenic	Cadmium	Copper	Lead	Zinc	pH*
Upper works demolition debris	508	5.6	4,540	189	889	7.6
Lower Works demolition debris	773	5.6	3,570	299	614	6.3
Flue debris waste	1,030	7.7	5,830	136	334	7.6
Area 1 railroad bed waste	1,060	3.4	4,150	392	645	4.4
Waste Piles 1 to 8	934	1.9	6,250	209	513	5.6
"Heap roast" slag pile	578	2.0	4,720	354	5,170	5.3
Floodplain wastes - Area 2	1,010	5.7	1,480	328	441	4.2
Floodplain wastes - Area 3	526	1.6	571	254	313	4.3
Red Sands	1,200	2.1	2,920	437	3,640	3.6
ALL WASTE SAMPLES	750	4.1	2,570	410	1,200	5.4
ALL WASTE SAMPLES MEAN + STANDARD DEVIATION	(2,100)	(14.4)	(9,140)	(1,470)	(5,377)	

NOTE: Concentrations reported as mg/kg.
( ) - value represents the geometric mean plus one standard deviation.

* pH values are the arithmetic mean of all samples collected in each area.

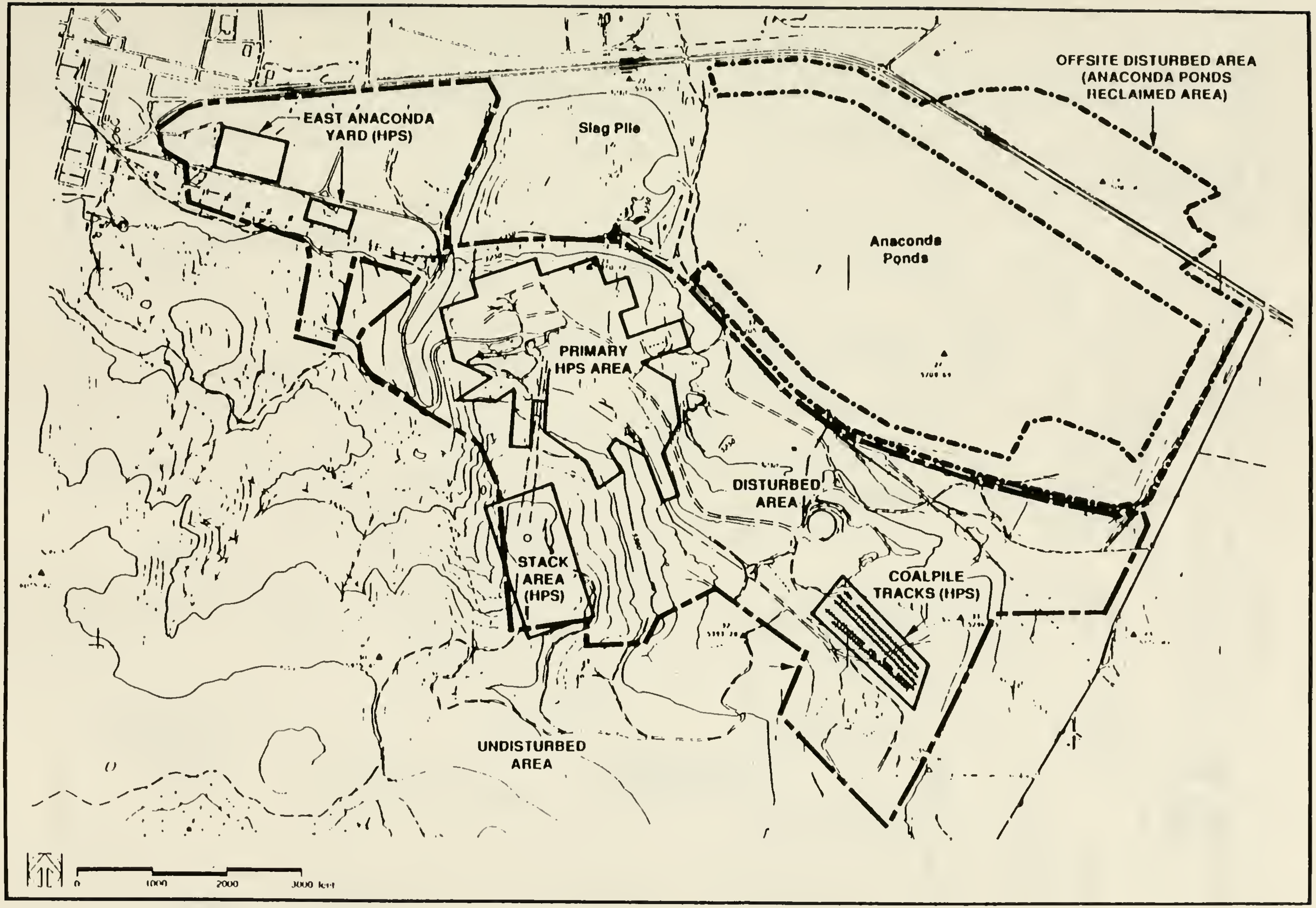


Figure 25: Delineation of aerial disturbance and the handling/procession areas on Smelter Hill (PTI, 1991).

TABLE 8: Estimated Areas and Volumes of Anaconda and Opportunity Ponds (modified from TETRA TECH, 1987)

Pond	Area (million ft^2)	Area (ac)	Average Depth Tailings (ft)	Volume (million ft^3)	Volume (million yd^3)
Anaconda					
1	11	240	105	1,160	43
2	14	320	105	1,470	54
Opportunity					
A	9	210	14.3	131	5
B1	24	560	22	537	20
B2	17	400	35	610	23
C1	27	630	27.5	755	28
C2	35	800	28	976	36
D1	0	0	0	0	0
D2	35	800	26	906	34

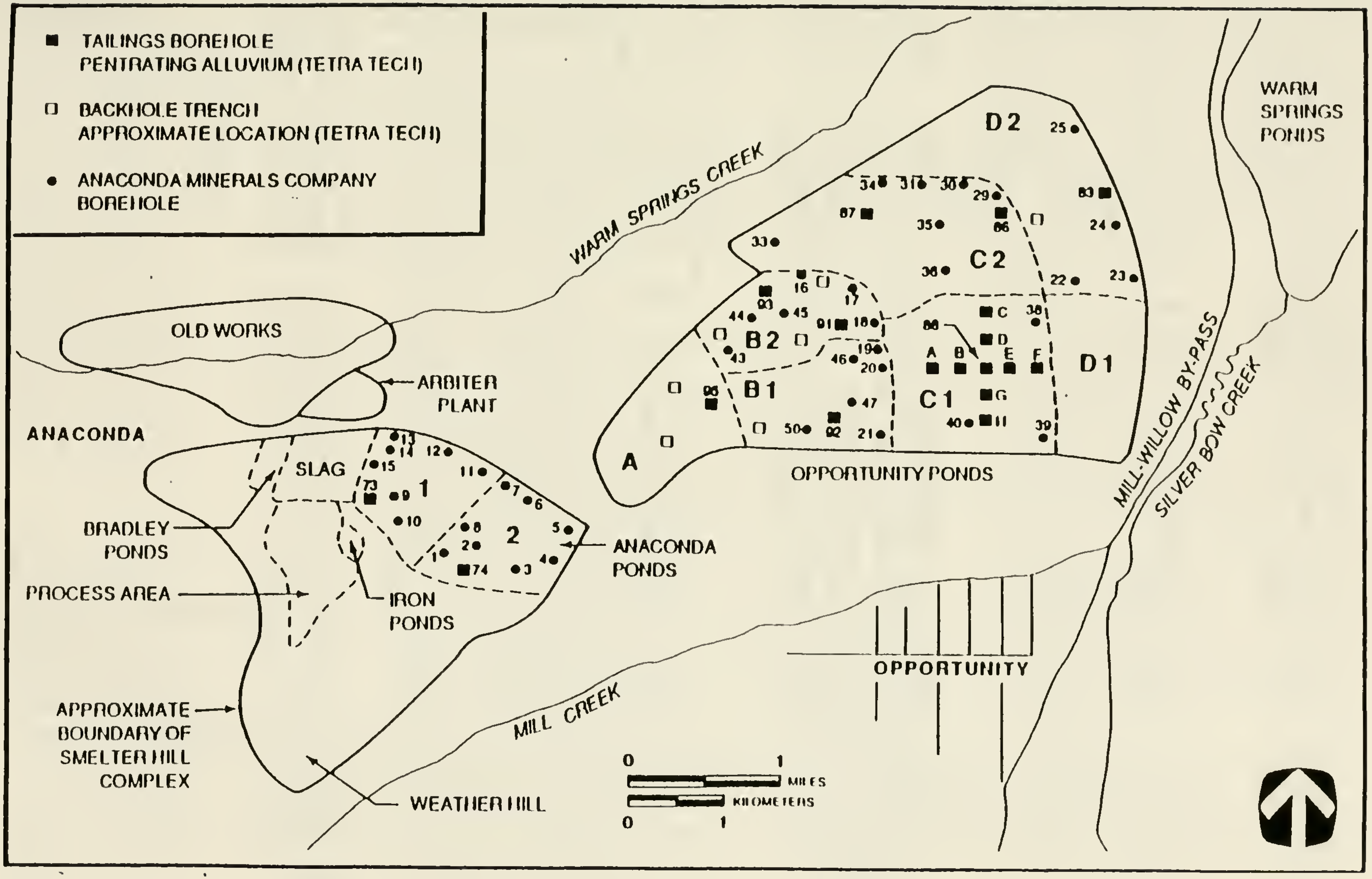


Figure 26: Locations of tailings sampling sites in the Anaconda and and Opportunity Ponds (TETRA TECH, 1987).

TABLE 9: Pond-Wide Tailings Data Summarized for Selected Variables, Anaconda and Opportunity Ponds (TETRA TECH, 1987).

Cell	Data Source[a]	No. of Boreholes[b]	Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Silver	Zinc	Total Sulfur[d]
			Average Concentration (mg/kg) ± Relative Standard Deviation (%) in Whole-Core Composites[c]								
Anaconda Tailings Pond											
1+2	Tt	2	168 --	8.4 --	3,490 --	41,400 --	500 --	2,500 --	7.4 --	2,320 --	3.9 ± 52
	AMC	15	NA[e]	NA	1,860 ± 15	49,200 ± 10	500 ± 30	NA	6.0 ± 65	980 ± 30	4.4 ± 14
Opportunity Tailings Pond											
A	Tt	1	370 --	8.2 --	2,200 --	11,800 --	600 --	1,200 --	10.0 --	1,490 --	0.9 ± 37
B1	Tt	1	NA	5.4 --	1,530 --	63,100 --	440 --	1,500 --	9.4 --	962 --	4.7 ± 83
	AMC	6	NA	NA	1,760 ± 21	48,200 ± 12	775 ± 15	NA	6.1 ± 59	1,250 ± 18	3.6 ± 10
B2	Tt	2	147 --	3.6 --	1,790 --	38,900 --	380 --	2,540 --	6.9 --	1,080 --	3.1 ± 80
	AMC	6	NA	NA	2,420 ± 14	65,800 ± 28	535 ± 25	NA	7.2 ± 40	1,360 ± 45	5.7 ± 29
C1	Tt	9	216 ± 27	5.2 ± 14	1,970 ± 17	43,200 ± 17	380 ± 28	2,880 ± 22	7.2 ± 24	1,570 ± 25	3.5 ± 74
	AMC	3	NA	NA	2,910 ± 27	50,500 ± 18	890 ± 33	NA	5.9 ± 43	1,750 ± 43	3.9 ± 32
C2	Tt	2	238 --	10.3 --	2,320 --	33,000 --	380 --	1,820 --	6.0 --	960 --	2.3 ± 68
	AMC	7	NA	NA	2,100 ± 36	49,300 ± 15	310 ± 44	NA	3.3 ± 52	840 ± 40	3.8 ± 23
D2	Tt	1	61 --	<20[f]	1,170 --	46,900 --	170 --	1,640 --	3.2 --	700 --	4.7 ± 61
	AMC	4	NA	NA	1,480 ± 49	50,800 ± 7	265 ± 66	NA	2.5 ± 29	560 ± 81	4.8 ± 23
All	Tt	16	210 ± 48	4.9 ± 52	1,930 ± 23	40,900 ± 28	384 ± 40	2,400 ± 40	7.1 ± 41	1,340 ± 34	3.3 ± 81
	AMC	26	NA	NA	2,090 ± 34	53,200 ± 23	530 ± 52	NA	5.0 ± 59	1,120 ± 51	4.4 ± 30
	Tt+AMC	42	210 ± 48	4.9 ± 52	2,030 ± 30	48,500 ± 27	474 ± 52	2,400 ± 40	5.8 ± 52	1,200 ± 44	4.0 ± 49

[a] Tt = Tetra Tech (1986b), AMC = Anaconda Minerals Company (1981).

[b] See Figure 16 for borehole locations.

[c] Averages are for all of the whole-core composites within a cell or pond. Relative standard deviations calculated on cells with >3 boreholes.

[d] Average concentrations in percent. Tetra Tech did not analyze for sulfur in the whole-core composite. Tetra Tech averages are for all of the individual samples for all of the boreholes within a cell or pond.

[e] NA = Not analyzed.

[f] Undetected at detection limit shown.

zones in the tailings: a shallow oxidized zone (typically 3-6 ft thick) at the top of the tailings ponds and a reduced zone beneath the oxidized zone (TETRA TECH, 1987). Average concentrations for selected elements in oxidized and reduced tailings deposits are given in Table 10.

Sulfide was found to be the predominant form of sulfur in the reduced tailings, while sulfate was predominant in the oxidized zone. Oxidized tailings had a typical slurry pH of 3-4, with a range of 2-7. Reduced tailings had a slurry pH range of 5-7. Copper, iron, zinc, and arsenic were somewhat enriched in the transition layer between the oxidized and reduced zones compared to their levels in unoxidized tailings. Arsenic and copper were generally enriched at the base of the tailings near the top of the alluvium(TETRA TECH, 1987).

Multi-variate statistical analyses (multiple analysis of variance, a principal components analysis) were performed using the solid phase tailing data (TETRA TECH 1986a). These tests indicated that horizontal variation of tailings composition within a single pond was of far less importance than vertical variation. Depth was a significant determinant of trace element concentration, but horizontal position was not (TETRA TECH, 1987).

Warm Springs Ponds

Three ponds were constructed by damming Silver Bow Creek and the headwaters of the Clark Fork River between about 1918 and 1959 (Figures 2 and 27). Fine to coarse grain sand in stream floodplains and within the ponds contain metals associated with the sulfide ore mined at Butte and processed in Butte and Anaconda. Pond bottom sediments also contain metals precipitated from Silver Bow Creek and smelter waste streams by the addition of lime. Contaminated pond sediments, floodplain tailings and related soils total over 20 million cubic yards (MDHES and CH2M Hill, 1989). Elevated concentrations of arsenic, copper, cadmium and zinc were common in the tailings and pond sediments (Appendix C).

Berms have been raised and Mill-Willow By Pass excavated during the early part of the 1990's. Currently, a groundwater interceptor trench is being constructed just north of Pond 1 and captured contaminated groundwater will be pumped to the ponds.

Other Areas

Sediments rich in arsenic and metals have also been deposited in the floodplain of Silver Bow Creek and along water supply ditches diverting water for industrial and/or agricultural use. Contaminated soil and groundwater has been identified south of the communities of Mill Creek and Opportunity along the Yellow Ditch. Soils in the area of Wells 232 and 235 (Figure 1 and Plate 1) contain elevated levels of arsenic, cadmium, copper lead and zinc.

TABLE 10: Average Concentrations (mg/kg) of Selected Elements at Stations in the Oxidized and Reduced Tailings, Anaconda and Opportunity Ponds (TETRA TECH, 1987).

Station and Sample Type[a]		Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Zinc	Total Sulfur
BH-73	O	110.5	6	1,575	39,100	203	643	1,165	2.95
	U	164.8	4.83	1,783	39,170	353.4	2,233.6	673.5	3.71
BH-74	O	92	2.1	1,095	43,000	128	208	585.5	5.05
	U	149.42	14.51	2,850.8	45,228	551.08	2,401.3	3,672.5	4.91
BH-83	O	95	7.5	2,303	49,450	305	2,605	1,326.5	5.46
	U	64.57	5.6	1,418.5	61,300	158	1,856.2	742.86	6.47
BH-86	O	199.67	5.7	1,116.6	27,266	347	908.33	561.33	1.85
	U	453.17	13.52	3,024.1	26,775	547.67	3,696.1	1,418.4	2.49
BH-87	U	44.57		1,867.1	32,642	48.57	197.29	293	2.75
BH-88	O	160	2.5	513	32,600	812	2,040	592	2.15
	U	218	4.32	2,120	81,740	326.8	3,450	1,610	4.97
BH-91	O	616	5	1,839.5	38,900	954.5	1,392.5	888	2.59
	U	234.6	4.61	2,306	46,510	382.9	2,924	1,376	4.31
BH-92	O	186.4	4.9	1,434	40,000	501.8	1,693.2	579	2.32
	U	254.75	8.13	1,752.5	107,250	245.25	1,262	1,255.5	10.36
BH-93	O	108.5	2.4	1,588	40,300	364	882.5	1,119	3.26
	U	230.73	10.47	1,973.9	43,345	426	3,451.8	1,296.0	3.71
BH-95	U	425.13	8.5	2,357.5	11,400	621.75	1,256.2	1,555	0.95
BH88A	O	121	2.8	547	35,700	582	1,034	386	2.35
	U	228.5	7.48	2,502.5	62,250	496	5,534	2,322.5	5.24
BH88B	U	285.67	7.58	2,910	63,050	325	2,621.5	1,518.3	5.1
BH88C	O	251.5	3.95	306.6	29,300	1,074	143.5	111.5	1.66
	U	281	8	2,128.1	51,825	385.63	3,817.6	1,844.6	5.14
BH88D	O	140		239	26,100	705	180	160	1.38
	U	253.33	5.26	2,322.8	59,200	285.5	3,130	1,488	5.72
BH88E	O	265	7.2	2,118.5	33,300	865.5	3,719	1,291	2.3
	U	224	4.7	2,326	62,180	300	3,593.4	1,494	6.27
BH88F	O	300	3.3	862	31,600	1,100	955	416	1.43
	U	436.25	7.01	2,852.5	50,150	532.13	4,172.5	1,902.5	4.67
BH88G	O	300	3.4	1,770	40,000	853	2,600	732	1.65
	U	262	4.94	2,384	61,080	408.2	3,816	1,890.6	5.31
BH88H	O	220	2.2	307	29,400	734	210	377	1.8
	U	241.67	5.92	2,520	55,833	431.17	4,715.3	1,947	4.45

[a] O = Oxidized samples.
U = Reduced samples.

Reference: Tetra Tech (1985a).

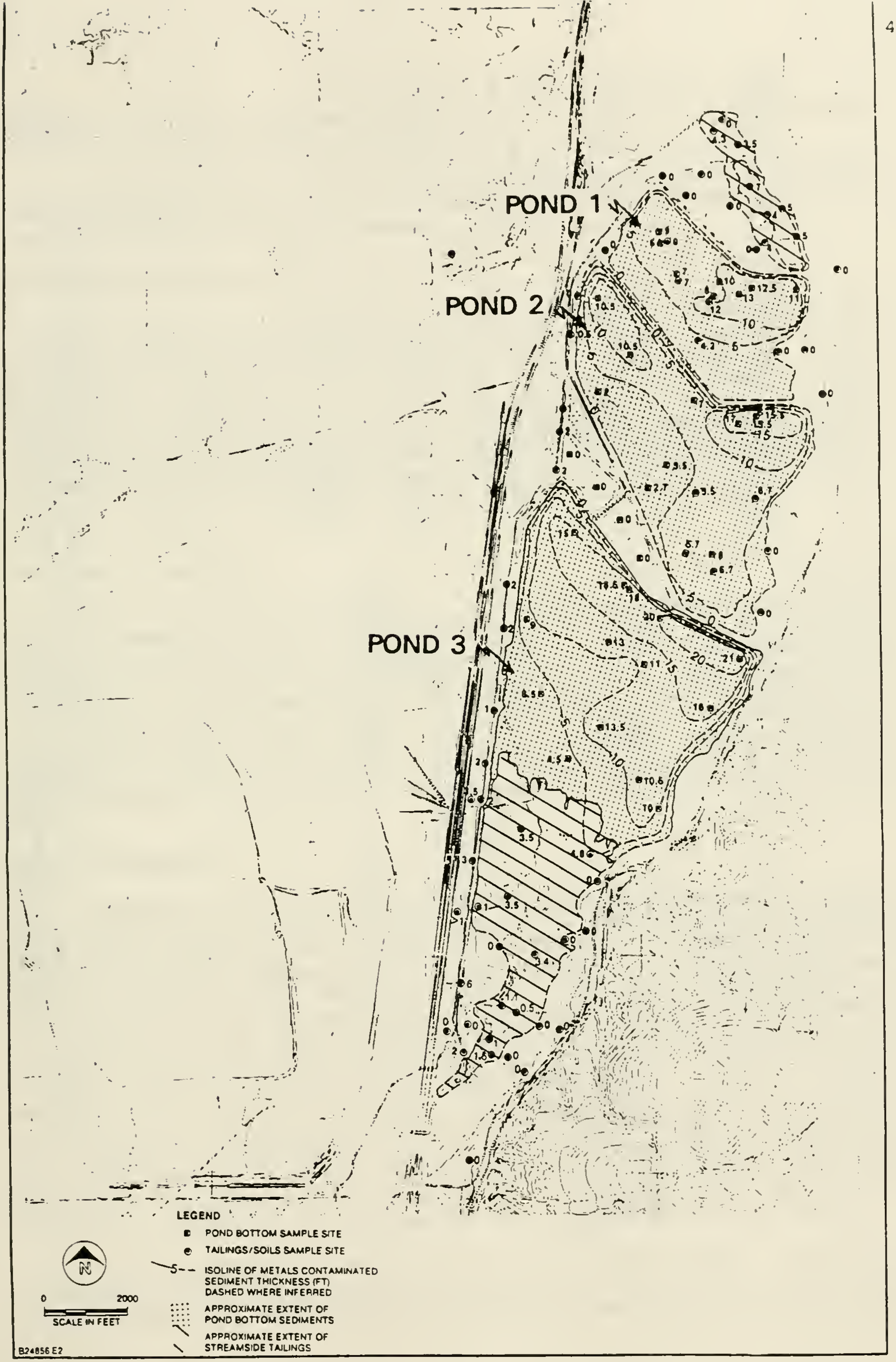
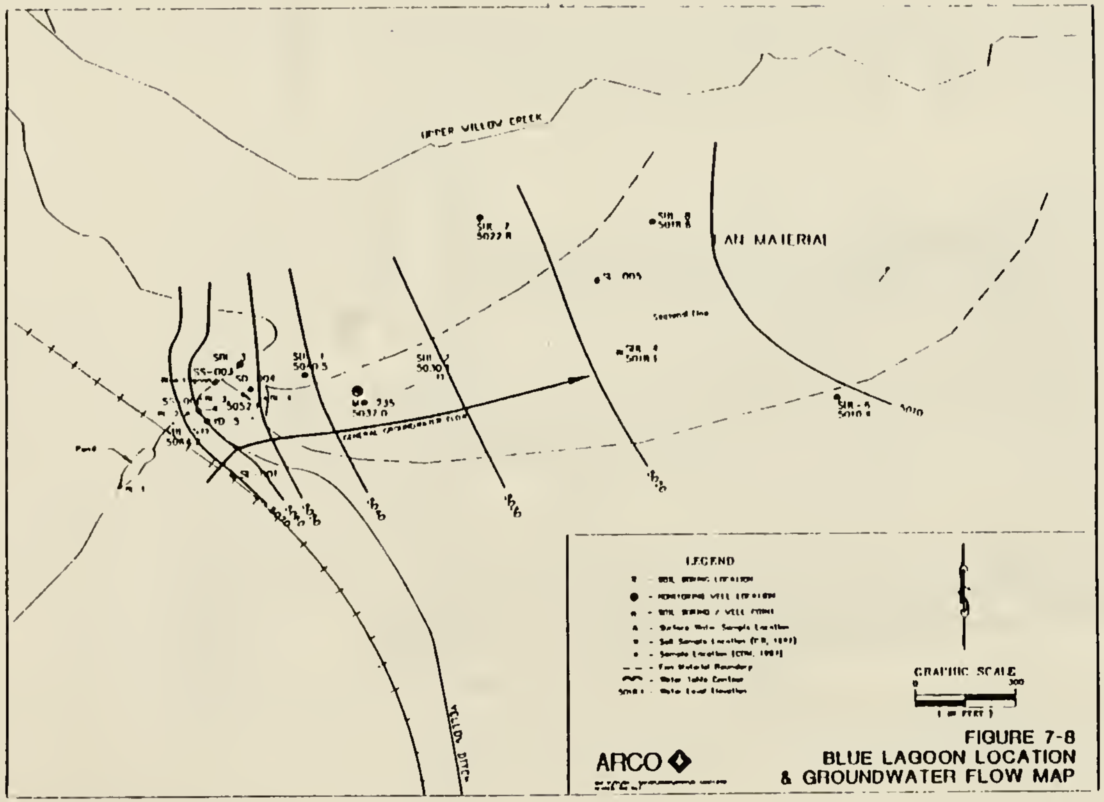

POND 1
POND 2
POND 3
LEGEND
POND BOTTOM SAMPLE SITE
TAILINGS/SOILS SAMPLE SITE
ISOLINE OF METALS CONTAMINATED SEDIMENT THICKNESS (FT) DASHED WHERE INFERRED
APPROXIMATE EXTENT OF POND BOTTOM SEDIMENTS
APPROXIMATE EXTENT OF STREAMSIDE TAILINGS
N
0
2000
SCALE IN FEET
B24856 E2

Figure 27: Tailings/bottom sediment thickness map for Warm Springs Ponds and vicinity (modified from MDHES and CH2MHill, 1989).



Waste (Sample ID)	Depth Interval	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Manganese (mg/kg)
Outwash Area							
SBL-2	0-0.3'	113	<3.8	11,300	57.9	1,780	770
	0.75-2.8'	22.2	9	7,590	<8.3	3,830	1,740
	2.8-4.6'	12.4	<3.8	2,470	17	1,070	889
	4.6-5.6'	24.7	8.4	4,780	12.6	1,960	2,040
	5.6-6.3'	18.3	<3.8	1,830	14.6	797	1,680
	6.3-7.3'	10.6	4.4	3,220	17.2	2,290	1,060
SBL-4	0.0-2.0'	118	<3.8	4,180	69.7	881	591
	2.3-4.0'	19.3	10	2,030	17.6	2,970	2,080
	4.4-8.0'	<5.8	<3.8	40.7	11.3	587	811
	8.0-12.0'	<5.8	<3.8	32.6	14.2	358	328
SBL-8	0.0-3.0'	39.7	<3.8	699	26.1	1,890	1,170
	3.0-6.0'	<5.8	<3.8	17.6	11	1,820	1,180
	6.0-8.0'	<5.8	<3.8	16.1	16.2	1,490	1,250
Well 235	0.0-2.0	41.4	7	3,040	28.4	1,890	1,170
	0.0-2.0	56.8	10.6	3,430	30.7	1,820	1,180
	4.0-6.0	8.4	3.9	2,200	10.9	1,490	1,250
Yellow Ditch	0-2'	115	<3.8	577	91.3	293	854
SBL-3	2-4'	93.8	<3.8	137	187	212	143
	4.2-6'	305	<3.8	257	116	197	348
	6-8'	9.6	12.6	2,190	29.4	2,990	928
Near Railroad Bed	0-4'	346	4.2	850	222	1,080	1,090
SBL-3	5-6'	38.1	<3.8	1,200	18.8	1,680	1,140

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Figure 28: Location map and table of soil arsenic and metal concentrations for the Blue Lagoon Site along the Yellow Ditch (ESE, 1994).

Examples of soil concentrations near well 235 (Blue Lagoon Location) are presented in Figure 28.

A summary of the total volume of wastes at the Anaconda site is presented in Table 11. These waste contain hundreds of tons of arsenic, cadmium, zinc and other metals.

Duration of the Release

Waste water, precipitation, stream water and groundwater have provided hydrological and geochemical conditions leading to the release and migration of smelting and mining wastes to the groundwater system in portions of the Anaconda area. Thus, groundwater contamination has been occurring in one or more portions of the site since 1884. Infiltration of precipitation and groundwater saturation of wastes continue to release contaminants. The generation of contaminated groundwater will most likely persist for hundreds to thousands of years (TETRA TECH, 1987).

Relevant Standards

The groundwater resources in the Anaconda region are used for stock, domestic and municipal supply (Konizeski et al., 1968). Thus the primary and secondary drinking water standards are considered relevant when assessing injury to the groundwater resources in the Anaconda region (EPA, 1992). All wells used for this study are located on the base map (Figure 1 and Plate 1) and all other plates. Review of water quality data for groundwater sampling sites in the Anaconda region revealed individual concentrations of constituents exceeded standards listed in Table 12.

Data Assessment

Appendix D contains a database that lists groundwater samples and concentrations of constituents that in most instances exceeded standards in the Anaconda area. This database was constructed from groundwater data found in published studies of the Anaconda area, reports, the U.S.G.S. WATSTORE database, and the Montana Bureau of Mines and Geology STORET system. Appendix D lists the values as they appear in the source reports, data qualifiers included. Below detection values are indicated by the qualifier "U" next to the value, which is the detection limit for that data point. When a value for a particular analyte in a study is not given, listed as not analyzed, listed as not required, or is rejected, the value is left blank and is marked "NA", for not analyzed. Other qualifiers are explained at the end of the appendix. The source of each data point is indicated in the database as well as the date the sample was taken. Samples are listed by well number and sample date.

In Appendix E, a second data set is presented. All below detection limit values reported in Appendix D have been replaced by a value equal to one half the published detection limit. All data

TABLE 11: Volumes of Contaminated Soils and Wastes in the Anaconda Region.

Location	Volume (yd^3)
Old Works	1.4 million
Smelter Hill	un-quantified
Anaconda and Opportunity Ponds	243 million
Warm Springs Ponds	20.8 million

TABLE 12: Primary and Secondary Maximum Contaminate Level Drinking Water Standards Exceeded in Anaconda Groundwater.

Constituent	Primary	Secondary
Arsenic*	50 ug/l	
Cadmium*	5 ug/l	
Chloride		250 mg/l
Chromium	100 ug/l	
Copper		1.0 mg/l
Fluoride	4.0 mg/l	2.0 mg/l
Iron*		300 ug/l
Lead	50 ug/l	
Manganese*		50 ug/l
Mercury	2 ug/l	
Sulfate*		250 mg/l
TDS		500 mg/l
Zinc*		5.0 mg/l

*Constituents selected for volume determinations qualifiers and source references remain. Detection limits for the various studies are not consistent and sometimes differ within the same report. The reader is therefore referred to Appendix D and the data points qualified by "U" when evaluating detection limits.

Appendix F lists only the median concentrations for each well, calculated using the data from Appendix E. For statistical purposes, "NA" data points are ignored. The total number of samples taken at each sampling point, n, is also given.

The data reported in the appendices was considered representative. It was assumed ESE and CH2M Hill data were valid, high quality data as reports contained extensive data validation. Generally, TETRA TECH and PTI data reports contain appendices that document the quality control though they lack data validation documents. These data were considered high quality. One report on domestic well sampling has less extensive quality control data (TETRA TECH, 1983). MBMG, USGS WATSTORE, and EPA STORET data sets do not list quality control data. However, these data provide important historical information and are used with the recognition that some metal values may be subject to some error.

Manner of Release and Pathway

Metal and other components of the smelting wastes in Old Works-Stucky Ridge, Smelter Hill, Anaconda and Opportunity tailings ponds, and Warm Springs Ponds have been leached and released for over 100 years by, among other pathways,: 1) waste water from the smelting process, including cooling water and tailings slurry water; 2) rainfall and snowmelt; 3) creek and ditch leakage; 4) sewage effluent from the City of Anaconda; 5) settling pond water. Today, the principal processes causing groundwater contamination are via recharge which infiltrates wastes and percolates to the water table, and groundwater flow through wastes in portions of the Old Works, Anaconda, Opportunity and Warm Springs Ponds.

Hazardous substances in the Old Works area have most likely been released by infiltrating water during and after the 19 years of smelting. Some contaminants may also enter the groundwater when flooding of Warm Springs Creek occurs and contaminated floodplain material is saturated and this water percolates to the water table. The leaching of hazardous substances from surface wastes is inferred from the presence of groundwater contaminated with arsenic, metals and other substances contained in the overlying wastes, occurring beneath and adjacent to the wastes. Experiments at the site included the simulation of two successive 100 year rainfall events to examine the potential to move arsenic and metals from the wastes to the groundwater. Infiltrating water moved metals greater than 15 ft in the jig tailings and over 12 ft in the heap roast wastes (ESE, 1994). In addition to infiltrating water, an examination of cadmium concentration verse time and water table fluctuation at well 206 shows an apparent correlation of metal concentration with the position of the water table (Figure 29). This water table fluctuation is a function of spring recharge by

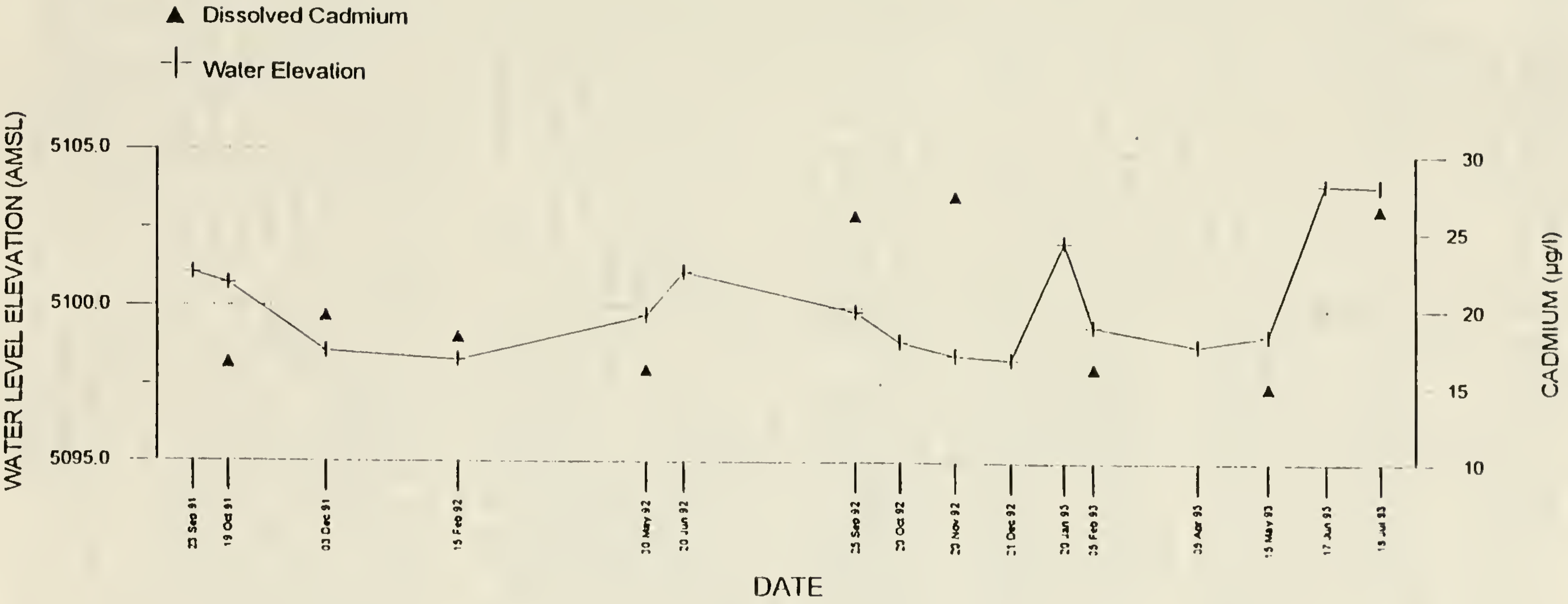

Figure 29: Cadmium concentration variation with respect to water table position and time at well site 206 ESE, 1994).

infiltrating surface recharge, recharge from Warm Springs Creek and recharge from the valley and bedrock groundwater systems connected to the aquifer underlying the Old Works area.

Groundwater flow in the vicinity of the Old Works site is principally in the course sand and gravel in the floodplain and fan sediments of Warm Springs Creek. Groundwater generally flows east-northeastward paralleling the creek (Figure 15 and 16). The hydraulic conductivity in the area is estimated at 200-500 ft/d (ESE, 1994). Using this range of values, an aquifer thickness of 13 ft, a hydraulic gradient of 0.013 and a porosity of 0.25, about 34 to 85 ft^3/d of groundwater flows through a 1 ft wide portion of the aquifer at a velocity of between 10 and 26 ft per day. This rate of transport assumes hazardous substances act conservatively and travel at the rate of groundwater flow. However, many metals react with aquifer material and their migration rate is slowed significantly. Data for the specific behavior of contaminants in the Old Works groundwater system has not been established. Portions of the groundwater system at the Old Works Site contain concentrations of cadmium, iron and manganese and copper that exceed drinking water standards (ESE, 1991).

The fractured bedrock underlying most of the Smelter Hill area allows infiltration of precipitation and surface water and lateral flow of groundwater from the mountain mass to the west. Natural recharge water becomes contaminated as it reacts with soluble hazardous substances in the overlying soil, wastes, and rock of the vadose zone. Drilling on Smelter Hill has revealed some fractures are filled with metal rich precipitates that are attributed to the percolation of waste laden water during smelter operation (PTI, 1991). In addition to the natural source of recharge, over 17.4 million gallons of water, was used on Smelter Hill during smelter operation (Figure 18). Undoubtedly, a portion of this water also became recharge. Interconnected fractures and joints allow migration of infiltrating water to the water table and contaminated groundwater occurs within at least the upper 60 to 120 ft of the fractured rock system (PTI, 1991). Groundwater gradients in the stack area are strongly downward. Groundwater migrates from the fractures to the adjacent alluvium to the east and north (Figures 5 and 6). Water table maps of the Anaconda region show water flowing from the bedrock to the east-northeast into the Quaternary and Tertiary valley floor sediments (Figure 15 and 16). Assuming a saturated thickness of 120 ft, an average rock hydraulic conductivity of 1.45 ft/d, a hydraulic gradient of 0.13 and a porosity of 0.05 (PTI, 1991), discharge from the bedrock would be about 23 ft^3/d per unit width and flow at a rate of 3.8 ft/d. As discussed for the Old Works Site, this rate of transport assumes hazardous substances act conservatively. However, many metals react with aquifer material and their migration rate is slowed significantly. Data for the specific behavior of contaminants in the Smelter Hill groundwater system has not been established. Portions of the groundwater system are contaminated with arsenic, cadmium, iron, manganese, zinc, fluoride, sulfate and TDS at concentrations exceeding drinking water standards.

Opportunity, Anaconda and other tailings ponds were formed when smelting wastes were slurried to a designated location and spilled out on the land surface or in shallow excavations from which berm material was borrowed. Tailings pond wastes have mixed with various wastes streams and created a complex geochemical environment in which contaminants are both stored and released. Today, contaminants reach the groundwater system by saturated and unsaturated flow as three to four inches of precipitation and/or snowmelt infiltrate the over six square miles of pond surface annually. In addition to the current recharge, historical operation of the site allowed large volumes of waste water to infiltrate the ponds and create groundwater mounds beneath each pond (see the discussion in the Introduction/Hydrogeology). Hazardous and other substances found in the tailings ponds are also found in the underlying groundwater.

Geochemical processes releasing contaminants from tailings deposits include but are not limited to oxidation and reduction reactions. Other principal controls include solubility reactions, sorption reactions, neutralization reactions, and dilution. Analysis of solid phase metal concentrations of the waste piles and tailings shows metals have been released by weathering reactions in the oxidizing zone, then partially re-precipitated at the tailings-alluvium interface (TETRA TECH, 1987). Trace element enrichment within the alluvium was limited to the top few feet beneath the tailings ponds (TETRA TECH, 1987). Remaining hazardous and other wastes continue to percolate to the water table. In portions of the tailings ponds saturated with groundwater high concentrations of contaminants are found.

The release of contaminants from the vadose zone of the tailings ponds is confirmed by water quality samples from suction lysimeters (Table 13). Aqueous-phase contaminants have been generated by leaching the oxidized zone of the tailings. Water penetrates the wastes slowly and dissolved constituents undergo numerous chemical transformations. Of the trace metals, copper, manganese, and zinc were found in the highest concentrations (i.e., >200 mg/l) (TETRA TECH, 1987). Sulfate, manganese, cadmium, copper, iron, lead, zinc and aluminum all exceed primary or secondary maximum concentration limit values.

In 1985 over 70% of the Opportunity tailings ponds bases and most likely a the western most portion of Anaconda Ponds were in contact with the groundwater system . Data collected from Wells 73, 88, and 91 (all screened in the saturated tailings) are shown in Table 14. In these samples copper did not exceed 51 ug/l, but arsenic concentrations were as high 3,600 ug/l. Details of the processes accounting for the observed solute levels in saturated and unsaturated tailings are discussed in TETRA TECH (1986 and 1987). Iron, manganese, fluoride, sulfate, TDS, aluminum, arsenic, cadmium and mercury all exceeded maximum contaminant level values.

ESE (1994) interpreted water level data and inferred the areas and thickness of tailings saturated with groundwater in 1985 and

TABLE 13: Summary of Lysimeter Water Quality Data, Opportunity Ponds (TETRA TECH, 1986, 1987).

Lysimeter	Depth, ft	pH	Slurry pH	DO mg/L	Eh,mV	Moisture percent (from neutron tubes)	Constituent, mg/L															
							SO_4	Ca	Na	Cl	SiO_2	K	Mg	Mn	As	Cd	Cu	Fe	Pb	Zn	Ba	Al
A shallow (near well 95)																						
12 Jun 85	5	--		--	--	--	1640	462	9.7	25	13	39	35	32	0.049	0.68	58	4.6	0.05	49	.012	5.1
8 Aug 85	5	4.6	3'-7.5':	5.1	+350	38.1	--	548	9.4	--	32	20	41	40	0.009	0.81	120	2.1	0.08	65	.012	9.6
19 Sep 85	5	3.4	3.4	5.5	+450	37.7	--	667	11	--	54	29	57	64	0.024	1.6	339	1.4	0.076	94	.016	39.4
19 Oct 85	5	3.2		4.5	--	36.2	3330	297	5.7	4.1	31	11	27	33	0.014	0.82	195	1.6	0.098	51	.007	23.0
A deep (near well 95)																						
12 Jun 85	9	--	7.5-10.5':	--	--	--	2260	473	102	13	13	28	47	143	0.026	1.0	58	0.2	0.08	192	.015	2.9
8 Aug 85	9	5.8	5.1	4.0	+350	12.4	--	480	82	--	14	24	47	149	0.017	0.99	51	0.14	0.07	201	.014	2.5
19 Sep 85	9	5.0		6.4	+310	11.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19 Oct 85	9	5.1		3.2	--	11.3	2320	265	37	10.6	8.8	14	27	96	0.008	0.64	24.5	0.12	0.060	109	.007	1.4
C2 shallow (near wells 85 and 86)																						
12 Jun 85	4.8	--	well 86:	--	--	--	--	540	88	--	7	34	123	111	0.031	0.13	1.7	1.0	0.05	16	.024	0.96
8 Aug 85	4.8	--	3.1-4.5	--	--	37.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19 Sep 85	4.8	6.1		3.8	+250	36.9	--	533	72	--	12	33	132	200	0.020	0.19	1.9	1.3	0.015	26	.025	2.04
19 Oct 85	4.8	6.0		6.0	--	35.7	--	--	--	--	--	--	--	--	--	--	--	--	--	-	--	--
C2 deep (near wells 85 and 86)																						
12 Jun 85	7.5	--		--	--	--	--	548	92	--	8	31	166	144	0.034	0.11	1.3	0.2	0.05	12	.015	0.41
8 Aug 85	7.5	--	Well 86:	--	--	41.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--		-
19 Sep 85	7.5	6.5	3.1-4.6	2.6	+230	41.0	--	527	70	--	11	26	137	127	0.028	0.10	0.89	1.2	<0.015	13	.010	0.37
19 Oct 85	7.5	6.6		3.4	+260	39.8	--	266	37	--	5.5	16	67	64	0.015	0.06	0.40	0.10	<0.054	6.5	.007	0.16

Reference: Tetra Tech (1986a).

TABLE 14: Groundwater Quality of Saturated Tailings Sampled at Wells 73, 88 and 91 (TETRA TECH, 1987).

	Well 73		Well 88		Well 91	
Variables	5/4/85	10/25/85	5/2/85	10/21/85	5/2/85	10/21/85
Analytes (mg/L)						
Ca	498	270	656	537	610	529
Fe	10.2	2.1	28.5	31.1	165.6	188
K	32.6	29	14.6	15	33.1	35
Mg	27.1	7.9	35.7	33.9	75.4	81.8
Mn	4.7	1.0	18.8	16.6	74.7	69
Na	22.7	23	35.4	23	24.7	15
SiO_2	10.2	1.8	21.8	13.4	28	15
Cl	5	3	9	7	50	4
F	1.8	2.3	8.1	7	8	9.5
PO_4	0.8	NA[a]	<0.5[b]	NA	<0.5	NA
SO_4	1,260	758	1,650	1,640	2,120	2,070
TDS	1,830	1,120	2,500	2,440	2,060	3,060
Alk	90	34	90	106	47	100
Field pH	7.0	6.3	6.6	6.5	6.2	6.6
DO	5.5	4.3	3.2	1.5	3.1	1.2
EC (umhos/cm)	2,016	1,430	2,536	2,460	3,355	2,130
Minor and Trace Elements (ug/L)						
Al	255	198	263	77	428	98
Sb	<14	<50	<14	<50	<14	<200
As	2,070	840	387	640	2,724	3,600
Ba	32	28	29	24	43	23
Be	<0.6	<4	0.7	<4	1.3	<4
B	50	<50	75	<50	200	<50
Cd	18	9	6	1	21	68
Cr	12	10	24	<5	54	<5
Co	<6.9	<4	10	<4	9	5
Cu	41	51	6	<6	10	7
Pb	<3.6	<15	<3.6	<15	<3.6	<15
Hg	<0.2	2.5	<0.2	<0.2	<0.2	<0.2
Mo	98	146	13	17	<6.9	21
Ni	42	<20	<34	<20	<34	<20
Se	<3.5	<5	<3.5	<5	<3.5	<5
Ag	4.5	<5	11	<5	20	<5
Sn	<36	<30	<36	<30	<36	<30
V	<3.5	7	9	14	12	14
Zn	230	101	1,038	712	325	160

[a] NA = Not analyzed.

[b] Undetected at detection limit shown.

Reference: Tetra Tech (1986b).

1992. With limited data, it appears a decline in saturated area has occurred since 1985 (Figures 30 and 31). However, the same areas of the ponds remain saturated. They did not present a map showing 1993 saturated tailings thickness which would have no doubt been greater than the 1992 area (Figures 21 and 22). These data suggest a portion of Opportunity pond tailings will continually be in contact with groundwater under current site conditions.

Groundwater flow beneath the Anaconda and Opportunity ponds is to the northeast. This water discharges to Mill-Willow By Pass, Warm Springs Creek and the Clark Fork River. Wells constructed just down-gradient of Opportunity ponds reveal coarse Quaternary deposits and somewhat finer grained Tertiary materials (Figure 32). In this area elevated concentrations of waste constituents are found to a depth of over 70 ft below the water table and are estimated to extend deeper than 100 ft in the underlying saturated Quaternary and Tertiary alluvium (Figure 33 and 34). Assuming a hydraulic conductivity of 145 ft/d, a gradient of 0.008 and a porosity of 0.25, and a saturated thickness of 70 ft (well 81), about 82 ft^3/d of contaminated groundwater would discharge per one ft width of aquifer. The hydraulic conductivity range was calculated by assuming the alluvial material was 25 ft thick and has an average hydraulic conductivity of 380 ft/d (Ford, 130-500 ft/d estimated from an aquifer test in vicinity of well 215, personal communication, 1994; TETRA TECH, 1986) and that 45 ft of Tertiary sediments has an average hydraulic conductivity of 13 ft/d (Table 1). The average groundwater flow velocity is about 4.6 ft/d per day.

In the Warm Springs ponds area, pond sediment, floodplain tailings deposits and contaminated soils are sources of groundwater contamination. Pond water seeping through contaminated pond berms and sediments releases metals and contaminates to the associated groundwater (Figure 35). In addition, tailings occupying the Clark Fork River floodplain north of the ponds are saturated by a high water table and thus metals are released from the tailings into the groundwater. Occasional flooding of the contaminated floodplains of Silver Bow Creek, Mill-Willow Bypass and the Clark Fork River also provides water to dissolve soluble salts collected on the floodplain and for the leaching of contaminants downward to the water table. Some contamination of groundwater west of the ponds occurs from the groundwater system emanating from beneath Opportunity ponds and other sources located further to the west. Groundwater emanating from Warm Springs Ponds exceeds maximum contaminant levels for arsenic cadmium, iron, manganese, sulfate, TDS and fluoride.

Groundwater flows north below and downstream from the Warm Springs Ponds, contaminating the coarse grained sediments lying below and north of the ponds. The seepage from the ponds has contaminated groundwater up to 40 ft below the water table with hazardous substances and wastes. Assuming a hydraulic conductivity of 200 ft/d, a hydraulic gradient of 0.004 and a porosity of 0.20, the discharge per unit width of aquifer is about 32 ft^3/d. The

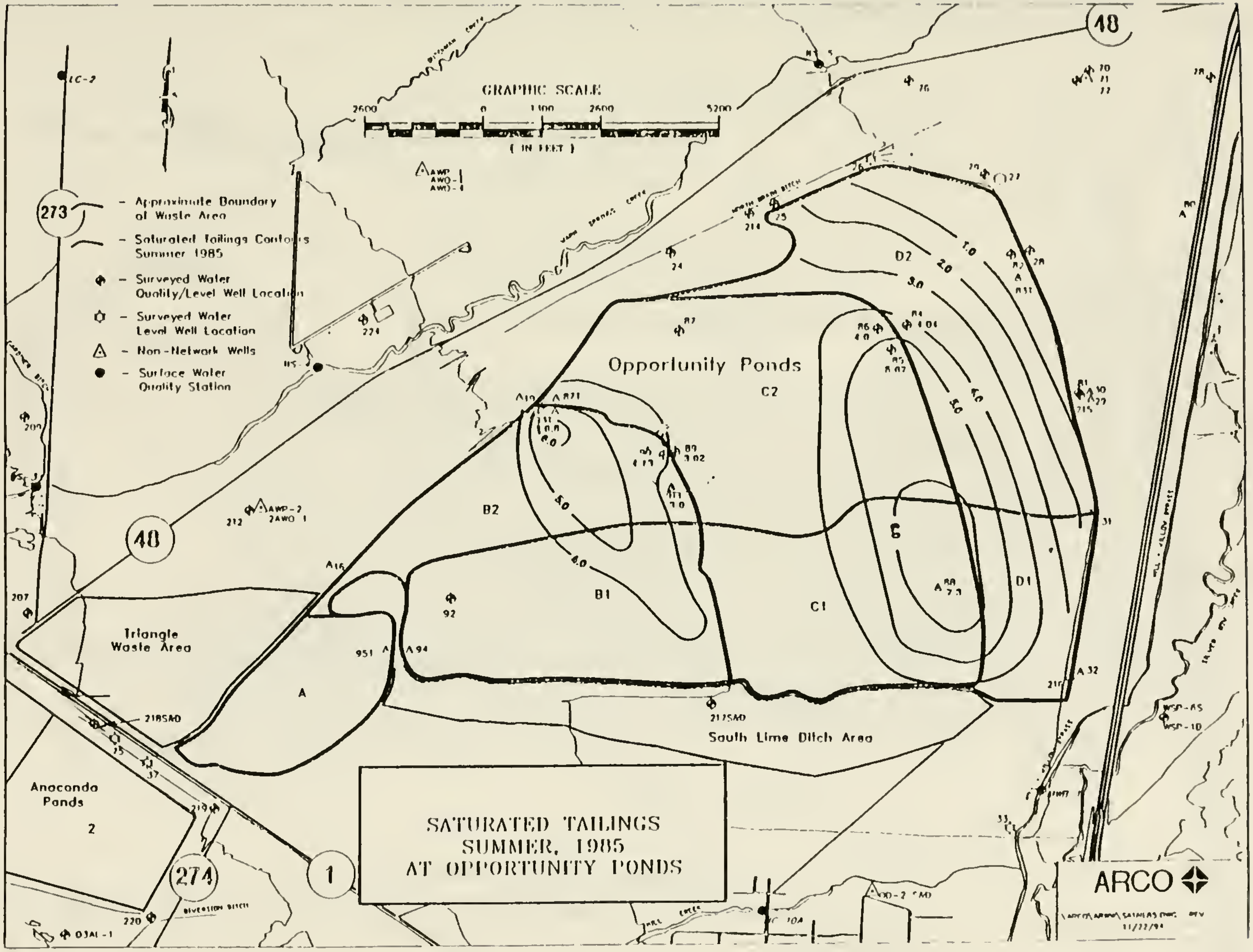

Figure 30: Saturated thickness of Opportunity Ponds tailings, summer 1985 (ESE, 1994).

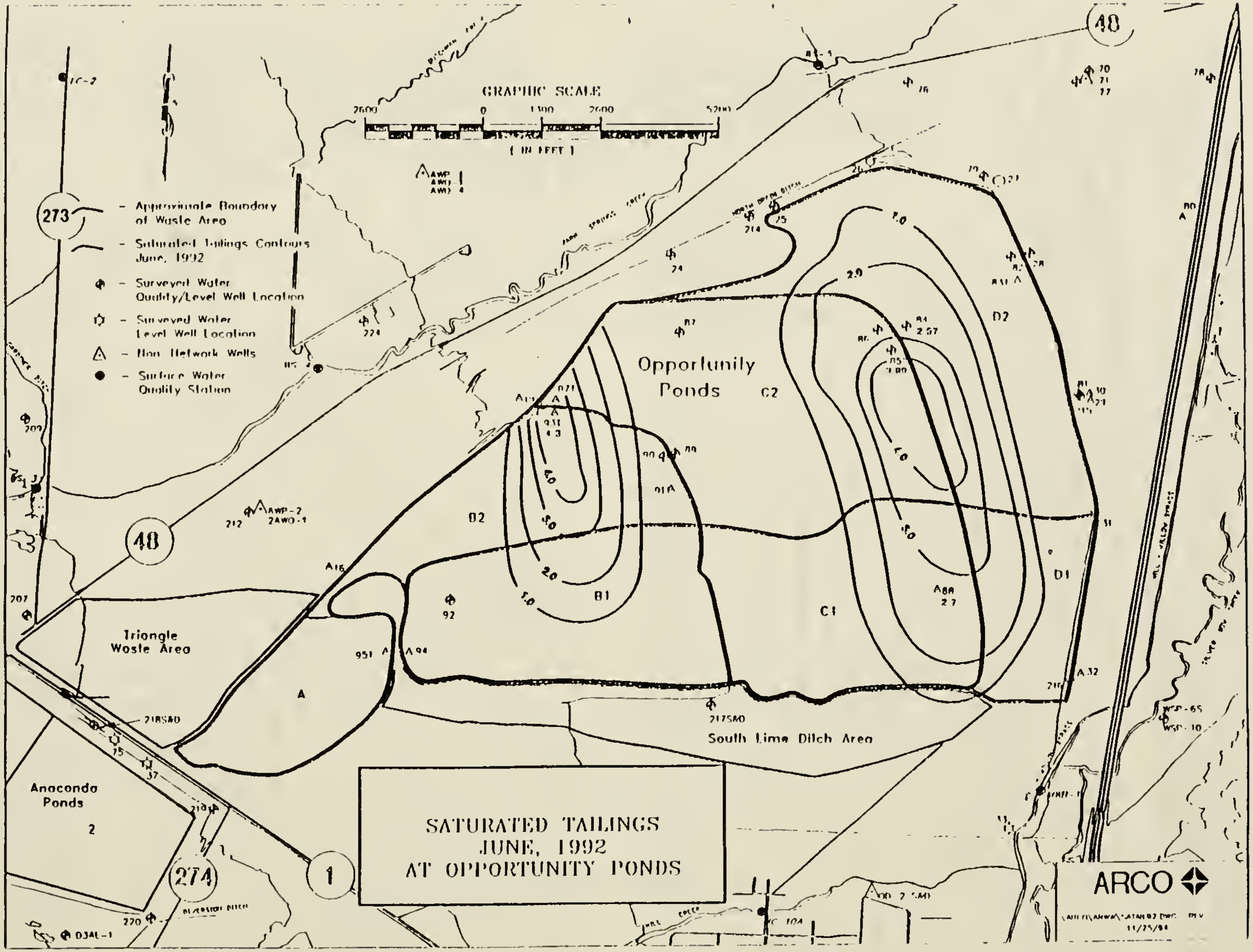

Figure 31: Saturated thickness of Opportunity Ponds tailings, June, 1992 (ESE, 1994).

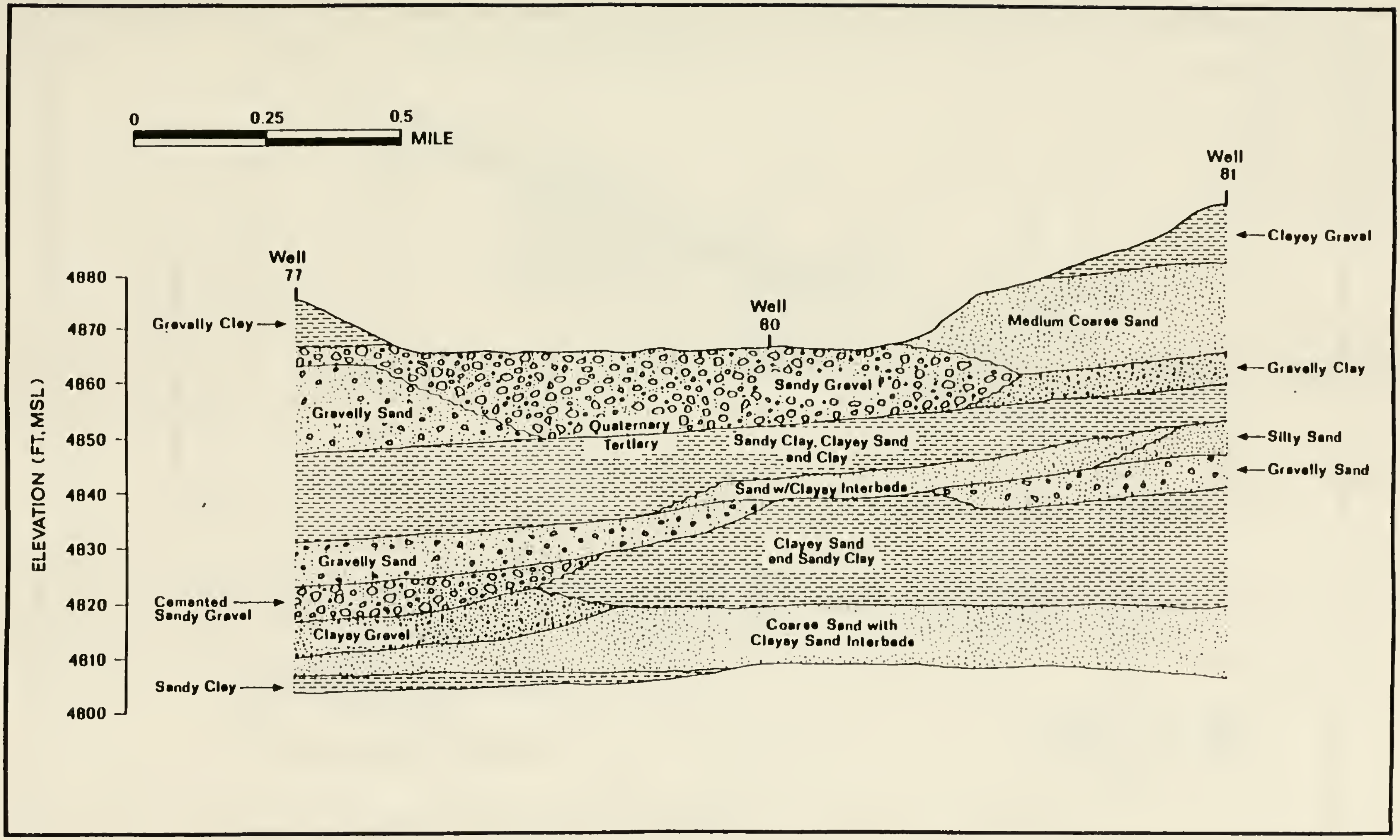

Figure 32: Northwest - southeast cross section for the area east of the Opportunity Ponds area (TETRA TECH, 1986).

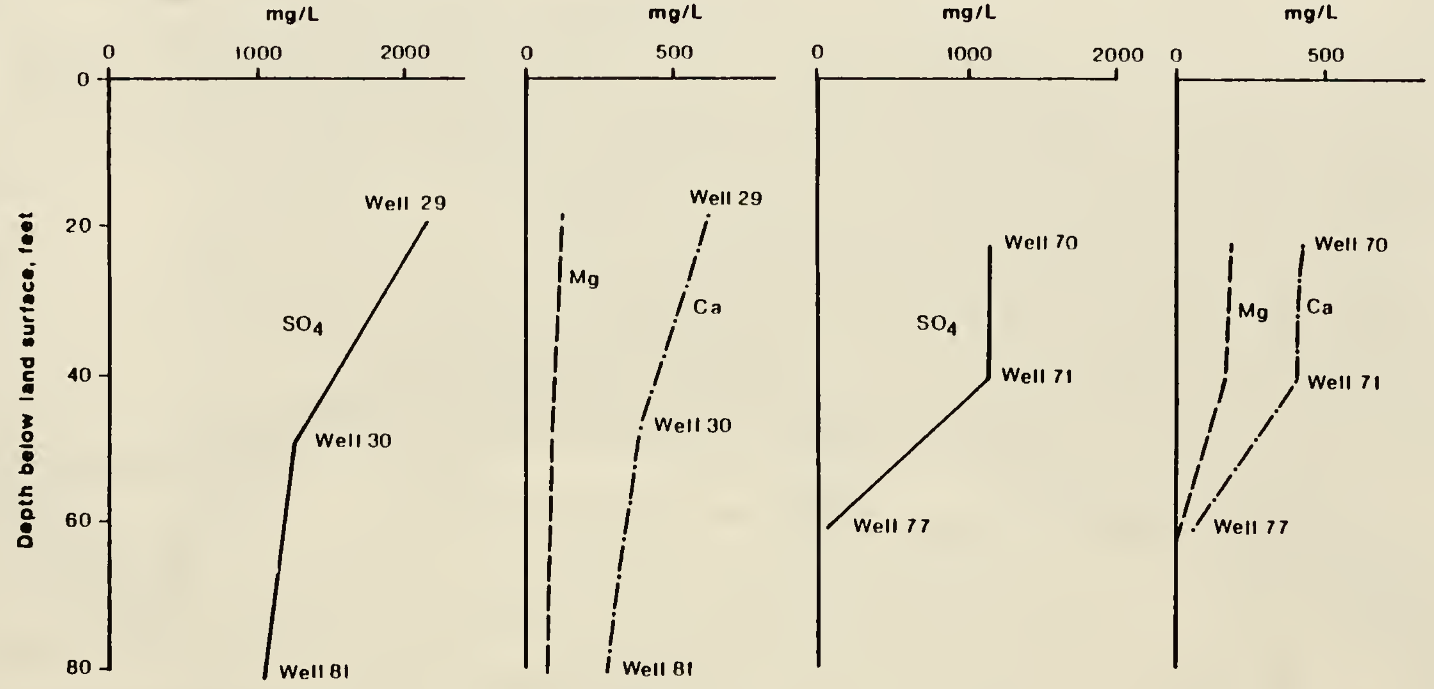

Figure 33: Water quality variation with depth in the alluvium down-gradient of the Opportunity Ponds (TETRA TECH, 1986).

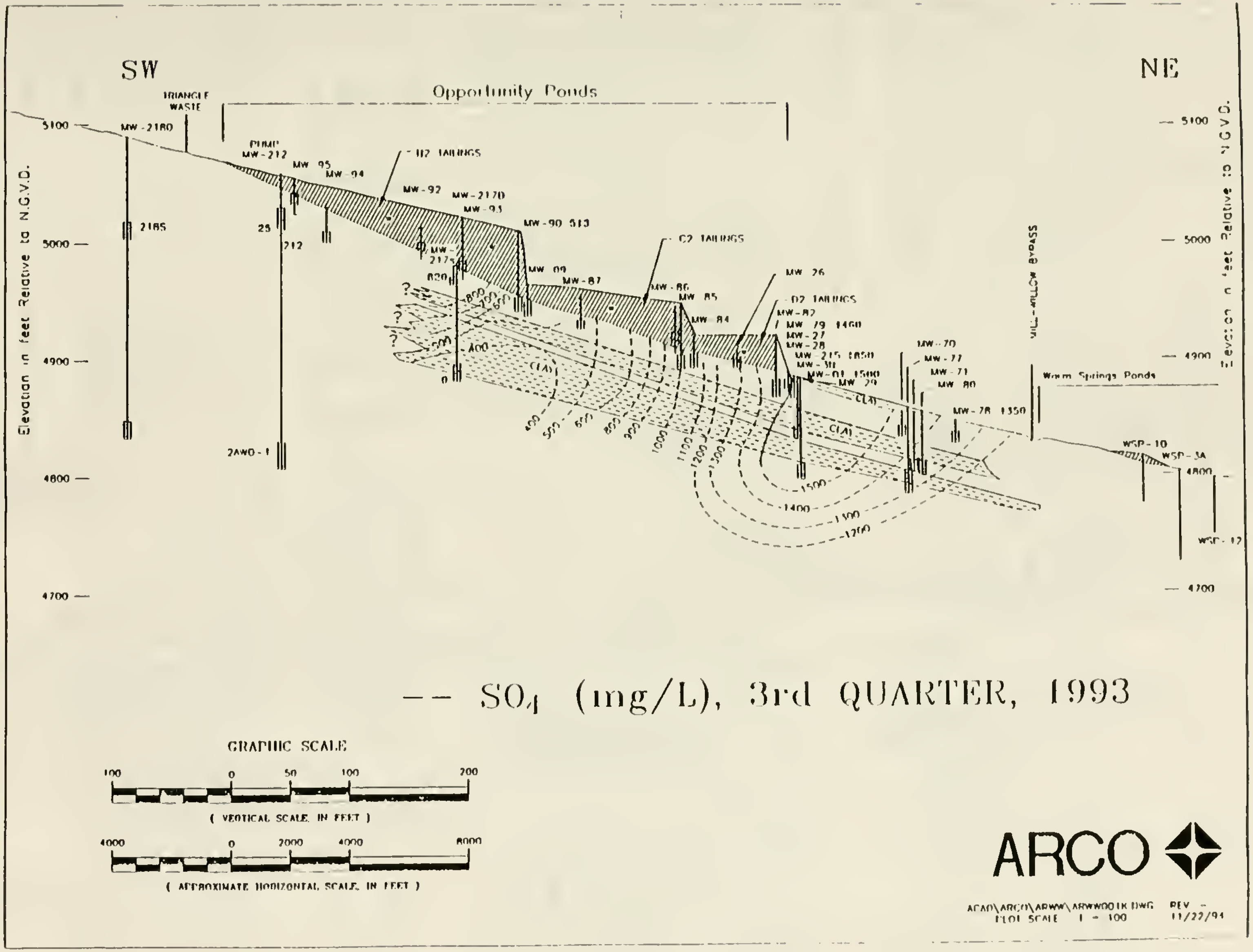

Figure 34: Sulfate concentrations beneath and down-gradient of Opportunity Ponds (ESE, 1994).

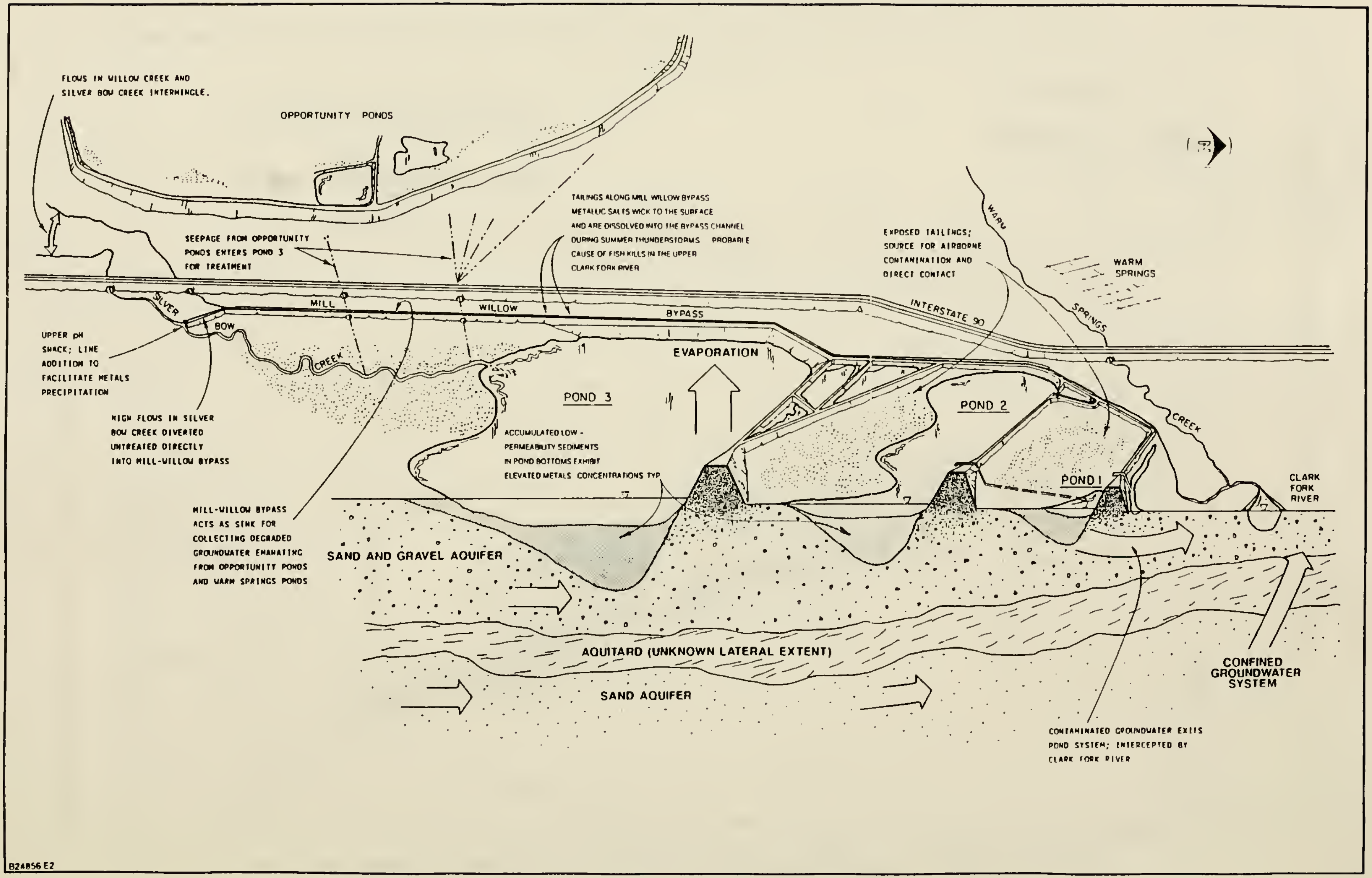
FLOWS IN WILLOW CREEK AND SILVER BOW CREEK INTERMINGLE.
OPPORTUNITY PONDS
SEEPAGE FROM OPPORTUNITY PONDS ENTERS POND 3 FOR TREATMENT
TAILINGS ALONG MILL WILLOW BYPASS METALLIC SALTS WICK TO THE SURFACE AND ARE DISSOLVED INTO THE BYPASS CHANNEL DURING SUMMER THUNDERSTORMS PROBABLE CAUSE OF FISH KILLS IN THE UPPER CLARK FORK RIVER
EXPOSED TAILINGS; SOURCE FOR AIRBORNE CONTAMINATION AND DIRECT CONTACT
WARM SPRINGS
WARM SPRINGS CREEK
N
SILVER BOW CREEK
MILL WILLOW BYPASS
INTERSTATE 90
UPPER pH SHACK; LIME ADDITION TO FACILITATE METALS PRECIPITATION
HIGH FLOWS IN SILVER BOW CREEK DIVERTED UNTREATED DIRECTLY INTO MILL-WILLOW BYPASS
EVAPORATION
POND 3
POND 2
POND 1
ACCUMULATED LOW - PERMEABILITY SEDIMENTS IN POND BOTTOMS EXHIBIT ELEVATED METALS CONCENTRATIONS TYP
CLARK FORK RIVER
MILL-WILLOW BYPASS ACTS AS SINK FOR COLLECTING DEGRADED GROUNDWATER EMANATING FROM OPPORTUNITY PONDS AND WARM SPRINGS PONDS
SAND AND GRAVEL AQUIFER
AQUITARD (UNKNOWN LATERAL EXTENT)
SAND AQUIFER
CONFINED GROUNDWATER SYSTEM
CONTAMINATED GROUNDWATER EXITS POND SYSTEM; INTERCEPTED BY CLARK FORK RIVER
B24856 E2

Figure 35: Conceptual model of contaminant migration pathways for the Warm Springs Ponds (CH2M Hill and Chen-Northern, 1989)

groundwater flows at an average velocity of about four feet per day.

GROUNDWATER INJURY QUANTIFICATION

Water quality data were compiled from 295 wells in and adjacent to the Anaconda area (Figure 1, Plate 1 and Appendix D). Water quality samples from multiple wells separated by greater than 100 ft exceeded drinking water standards for one or more constituents in a number of areas in the vicinity of Anaconda and Warm Springs Ponds. Groundwater located outside the processing, treatment, waste disposal and pond areas generally is not contaminated, with the exception of the regions immediately east of Opportunity Ponds, near Silver Bow Creek, the Yellow Ditch and north of Warm Springs Ponds.

Baseline Conditions

Wells in the southern portion of the Deer Lodge valley are used for stock, domestic and municipal supply. Though the water quality from wells directly associated with monitoring waste areas typically exceeds drinking water standards, the water from other wells in the region is unaffected by the contaminated water. It is these uncontaminated samples that were used to represent background or baseline groundwater quality. The baseline or control area groundwater quality in the southern Deer Lodge Valley area is represented by the water quality of wells located mostly north, northeast and south of the contaminated portion of the Quaternary and Tertiary sand and gravel, and bedrock aquifers. The criteria used to designate groundwater quality data as baseline included the conditions that:

1. Wells were located in a similar geologic setting;
2. Wells were located in a similar groundwater flow system;
3. Wells were close to the contaminated area;
4. Wells were completed in the same aquifer that is contaminated;
5. Water quality data were readily available.

Table 15 lists the wells used to represent baseline for the constituents listed in Table 12. Locations are presented on the base map (Figure 1 and Plate 1) and in Figure 36. These wells were selected by reviewing the water quality data presented in Appendix F. A baseline groundwater quality was then determined by rank ordering median concentrations of samples taken from wells listed in Table 13 and determining the median value of that group of values. The results of this analysis are presented in Table 16.

Extent of Injured Groundwater

The area underlain by groundwater that exceeds a standards for selected dissolved constituents, arsenic, cadmium, iron, manganese zinc and sulfate, as defined in Table 12, was estimated using two

TABLE 15: 109 Wells with Samples of Groundwater Considered as Background Water Quality in the Anaconda Area.

1, 9, 10, 11, 48, 49, 50, 51, 52, 59, 72, 99,

100, 200, 201, 202, 204, 205, 207, 208,

209, 211, 212, 220, 221, 224, 225, 227, 228,

229, 231, 232, 233, 304, 309, 319, 321, 328,

329, 408, 411, 501, AN1, AN2, AN5, DW1, DW2, DW3, DW4,

DW5, DW304, DW309, DW312, DW319, DW321, DW328, DW329,

E2AL1, E2AL2,F2BR, FH1, FH2, GW1, GW6, LF4, MBMG1195,

MBMG2670SP, MBMG2673, MBMG2678, MBMG2679, MBMG2681,

MBMG2682, MC1, MC3, MC5, MC6, MC7, MC8, MC9, MC10,

MC11, MC12, MC13, MC14, MC15, MC16, MC17, MC18,

MC19, MC20, MC21, MC22, MC23, T1A, T1B, T1C, T1D, T1E,

T2A, T2B, T2C, T2D, T2E, WSP-1, WSP-6, WSP-9, WST2

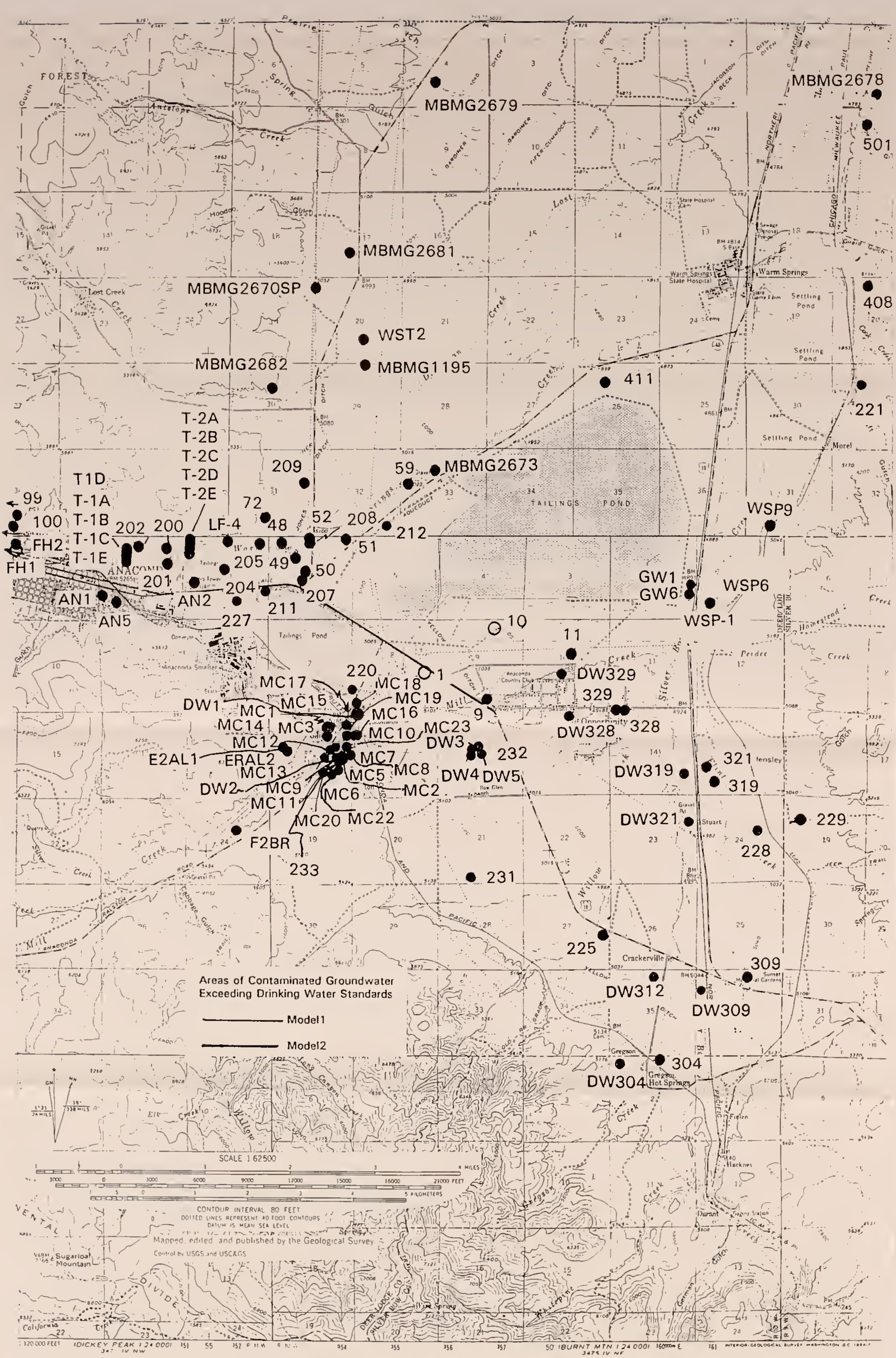

Figure 36: Location map of the groundwater quality data considered to represent baseline groundwater chemistry (wells are indicated by solid dots, also see Plate 1).

TABLE 16: Median Concentrations of Selected Constituents for Baseline Groundwater Data (Table 15).

Constituent	Baseline Concentration Constituent	n
Arsenic	2.5 ug/l	102
Cadmium	1 ug/l	101
Iron	15 ug/l	83
Manganese	4.2 ug/l	63
Zinc	30 ug/l	108
Sulfate	39 mg/l	86

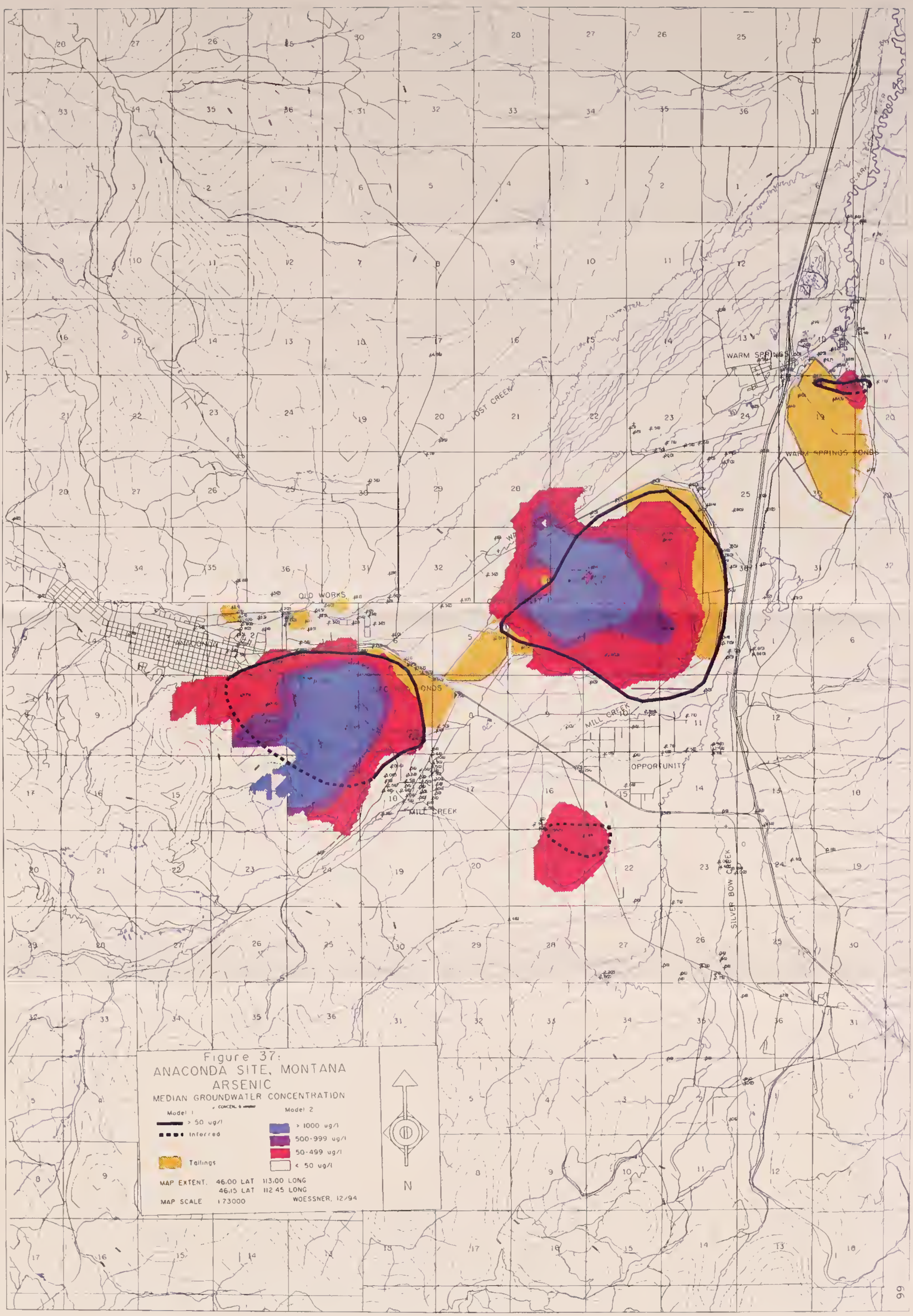

Figure 37:
ANACONDA SITE, MONTANA
ARSENIC
MEDIAN GROUNDWATER CONCENTRATION

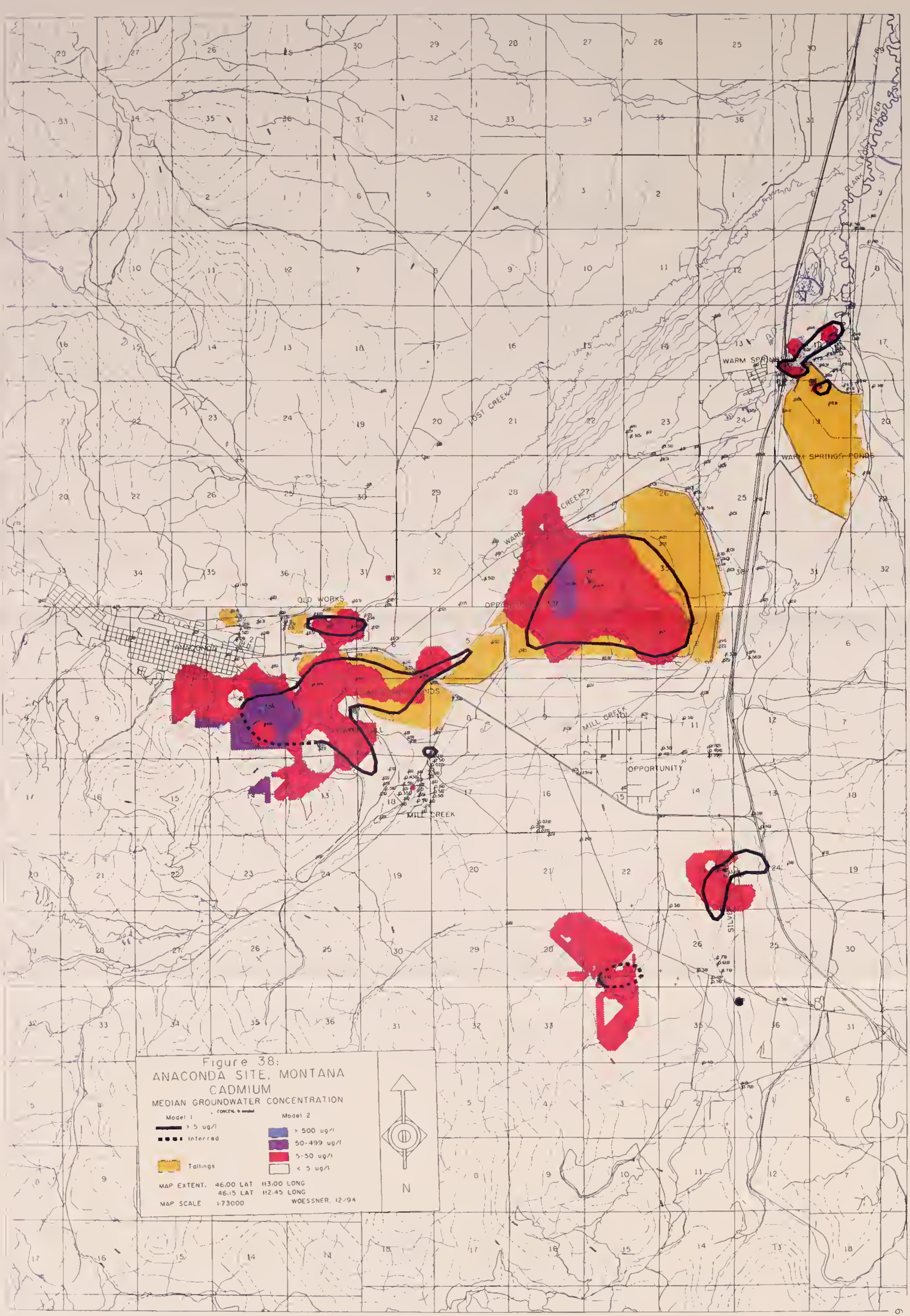

Figure 38:
ANACONDA SITE, MONTANA
CADMIUM
MEDIAN GROUNDWATER CONCENTRATION

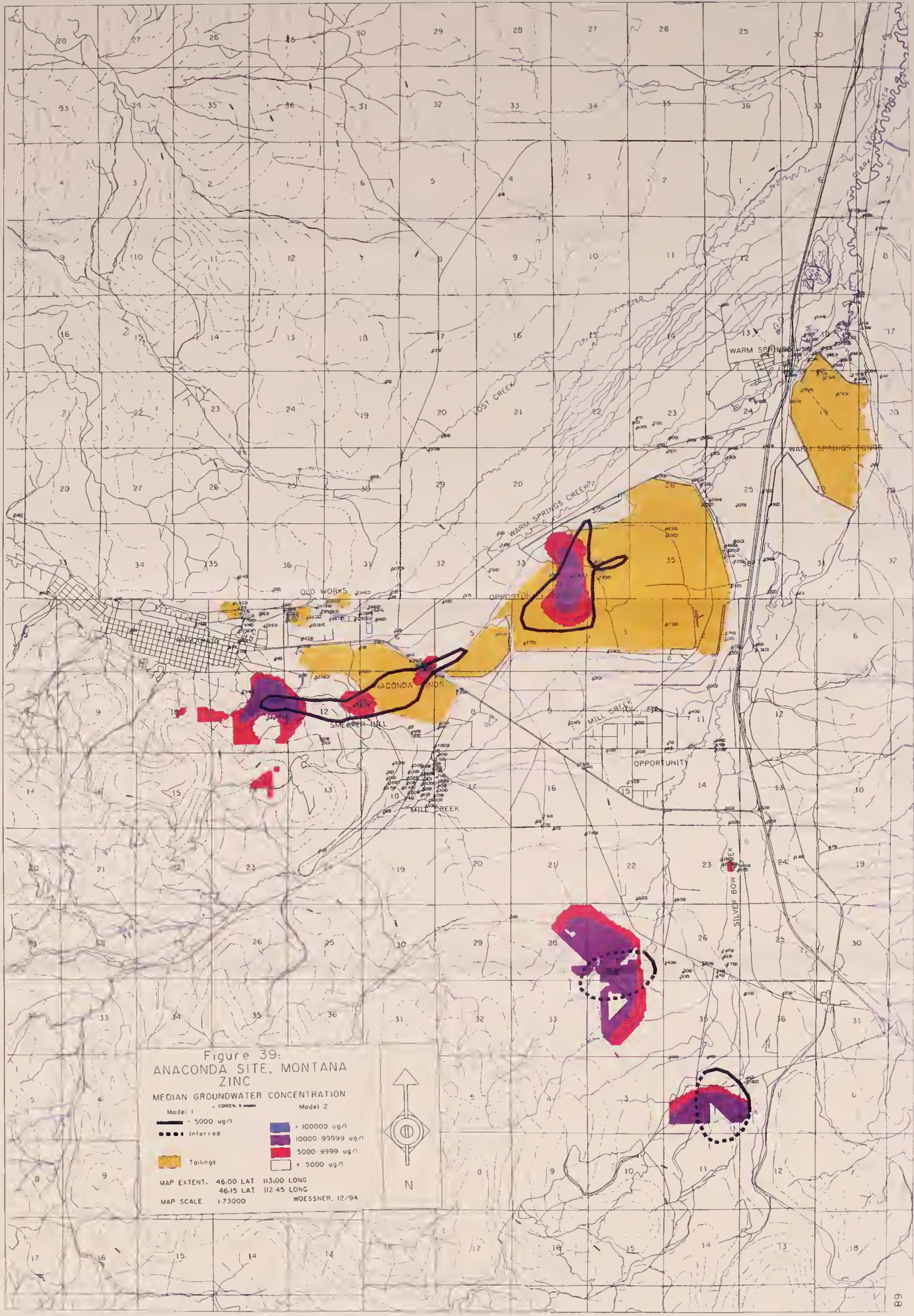

Figure 39:
ANACONDA SITE, MONTANA
ZINC

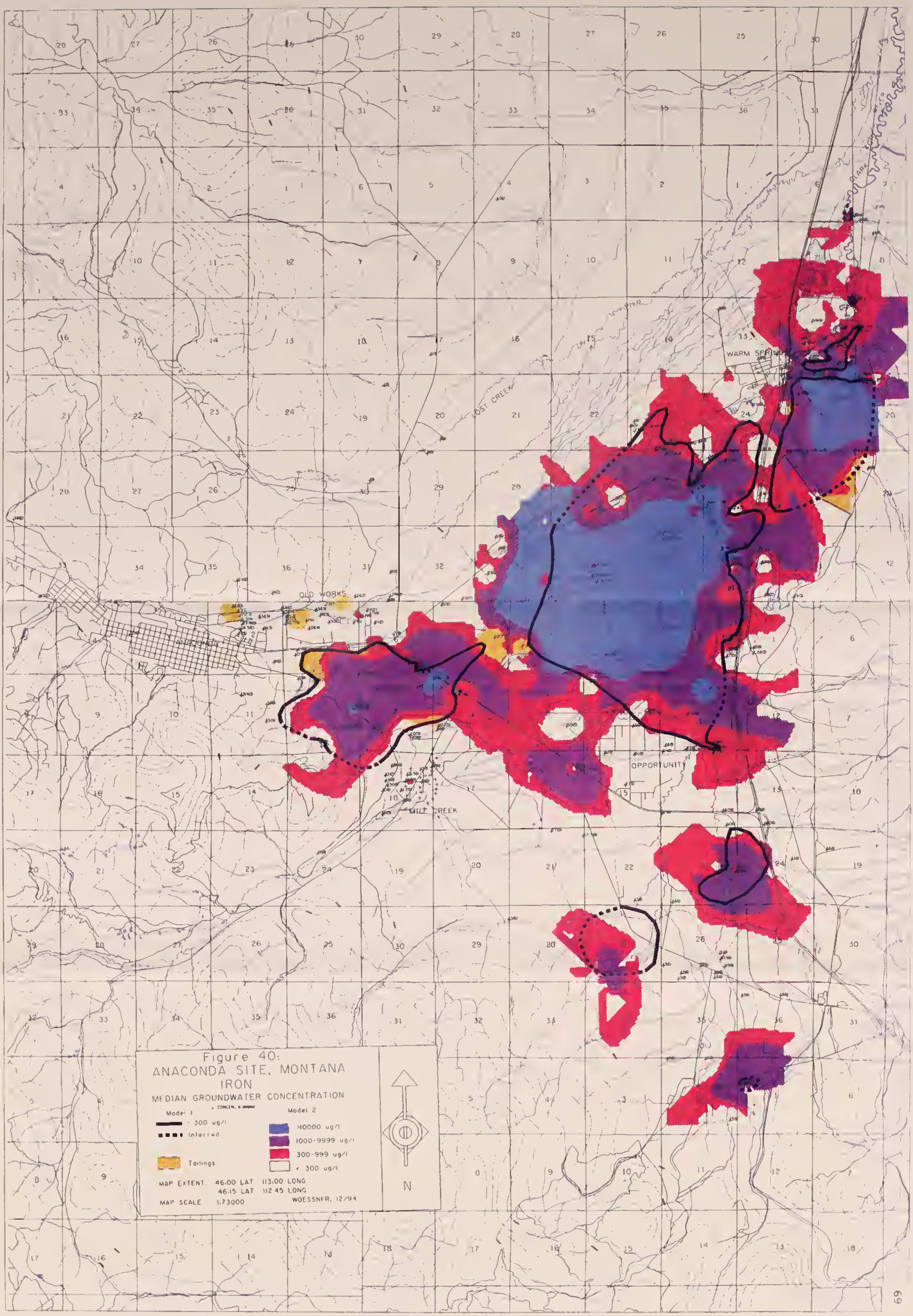

Figure 40:
ANACONDA SITE, MONTANA
IRON
MEDIAN GROUNDWATER CONCENTRATION

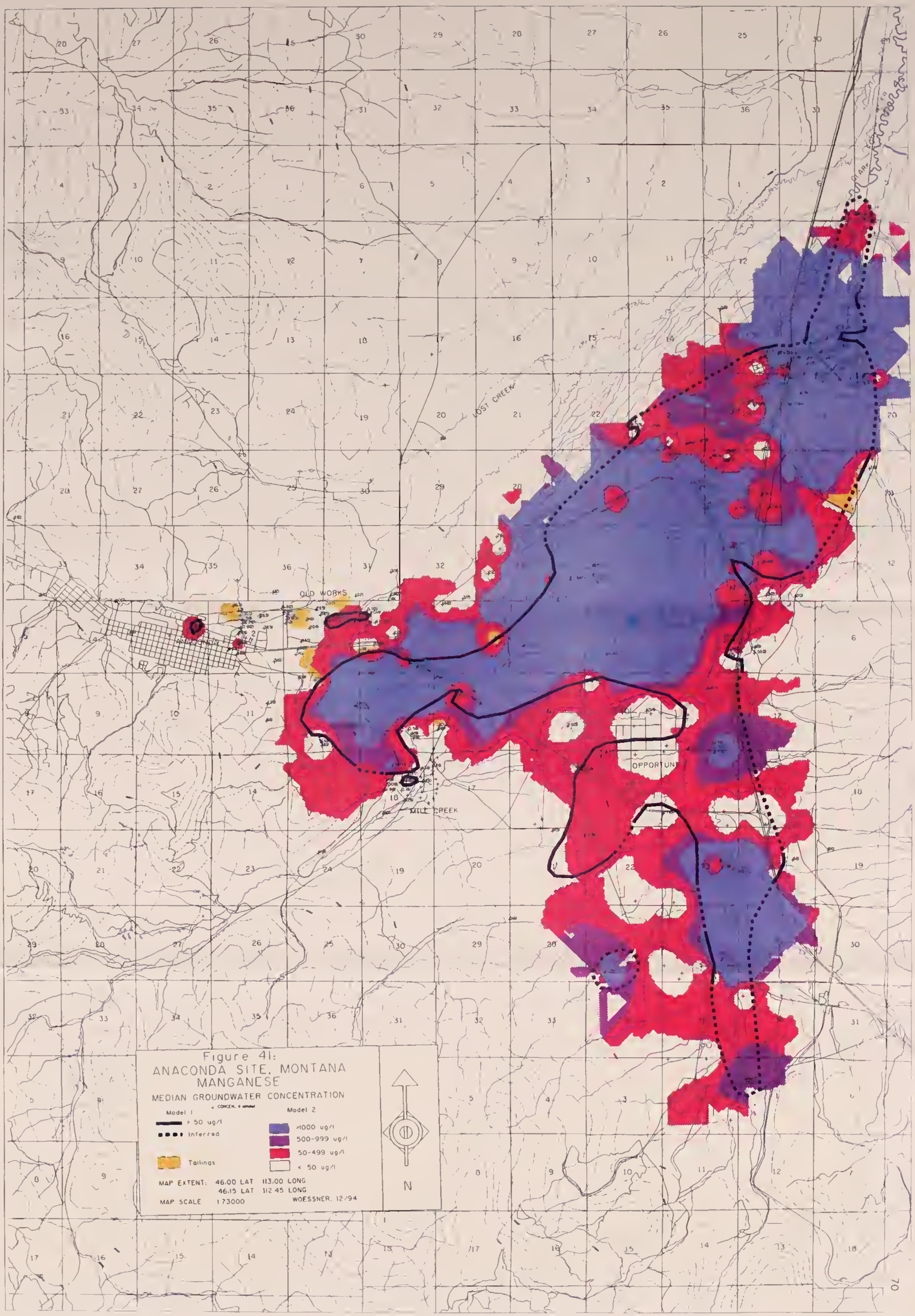

Figure 41:
ANACONDA SITE, MONTANA
MANGANESE
MEDIAN GROUNDWATER CONCENTRATION

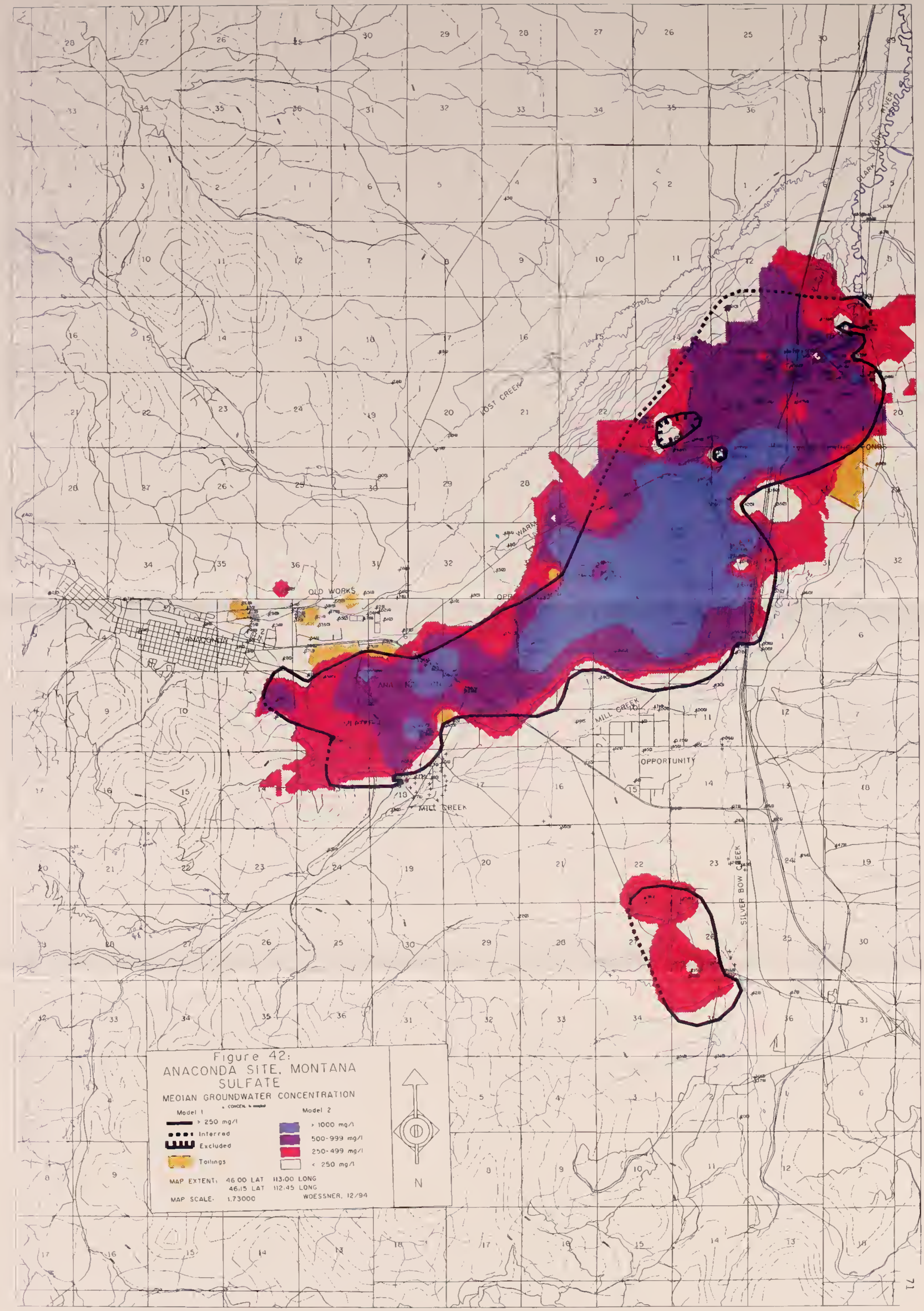

Figure 42:
ANACONDA SITE, MONTANA
SULFATE
MEDIAN GROUNDWATER CONCENTRATION

methods. The first method, Model1, employed a hydrogeologist (the author) to interpret the data using linear interpolation and his knowledge of the hydrogeologic setting of the site. The second method, Model2, used an automated weighted average interpolation scheme with a search radius of 3,300 ft to create a digital elevation model using PAMAP (PAMAP, 1992). Results of the application of both of these two mapping methods are presented in Plates 2 to 7 and Figures 37 to 42.

The total volumes of contaminated groundwater exceeding drinking water standards were calculated for both models using PAMAP to numerically determine areas, and ranges of depth and porosities values for volcanic bedrock and valley alluvium. Based on a review of the geologic setting and boring information the thickness of the saturated contaminated Quaternary and Tertiary deposits was poorly defined. The saturated thickness of the tuffs making up Smelter Hill are also not fully determined.

Information on the saturated thickness of the alluvial aquifer that is contaminated are in part based on information provided by TETRA TECH (1986) and ESE (1994). They reported that groundwater in two well clusters, 29, 30 and 81, and 70, 71 and 77 (Figure 1 and Plate 1), located down gradient of Opportunity Ponds (Figure 33), was contaminated to a depth of approximately 70 ft below the water table with manganese and sulfate. Iron concentrations exceeded standards to a depth of about 50 ft in these nests. Contaminated groundwater was also documented in the vicinity of the Old Works Site (ESE, 1992) and Warm Springs Ponds (MDHES and CH2M Hill, 1989). In addition, it is reported that in the mid 1980 about 70 % of the Opportunity Ponds were saturated with groundwater (TETRA TECH, 1986). It appears that at least 50% of the tailings were saturated with a foot or more of groundwater in June, 1992(Figure 31). However, few wells are finished in the saturated tailings. No wells completed below the tailing pond sediments extends more than about 25 ft into the underlying saturated alluvial material. However, downward vertical gradients are present in the tailings ponds area and there is historic and existing groundwater conditions that would permit deeper migration of arsenic and metals below the monitored 25 ft depth. Wells finished below Warm Springs Ponds show arsenic exceedences to a depth of 40 ft in what may be viewed as similar geologic material. Thus, concentrations of arsenic, cadmium, and zinc exceeding drinking water standards are approximated to extend to depths of 25 to 40 ft below the water table. These depths would include saturated tailings in some areas.

Groundwater quality in the Smelter Hill has been impacted to a depth of existing monitoring wells, approximately 200 ft below land surface (PTI, 1992). Saturated bedrock of Smelter Hill, located west of the boundary presented in Figure 43, was considered contaminated to depths of between 60 to 120 ft.

The volume of contaminated groundwater in the sand and gravel deposits, and tailings was then multiplied by a range of

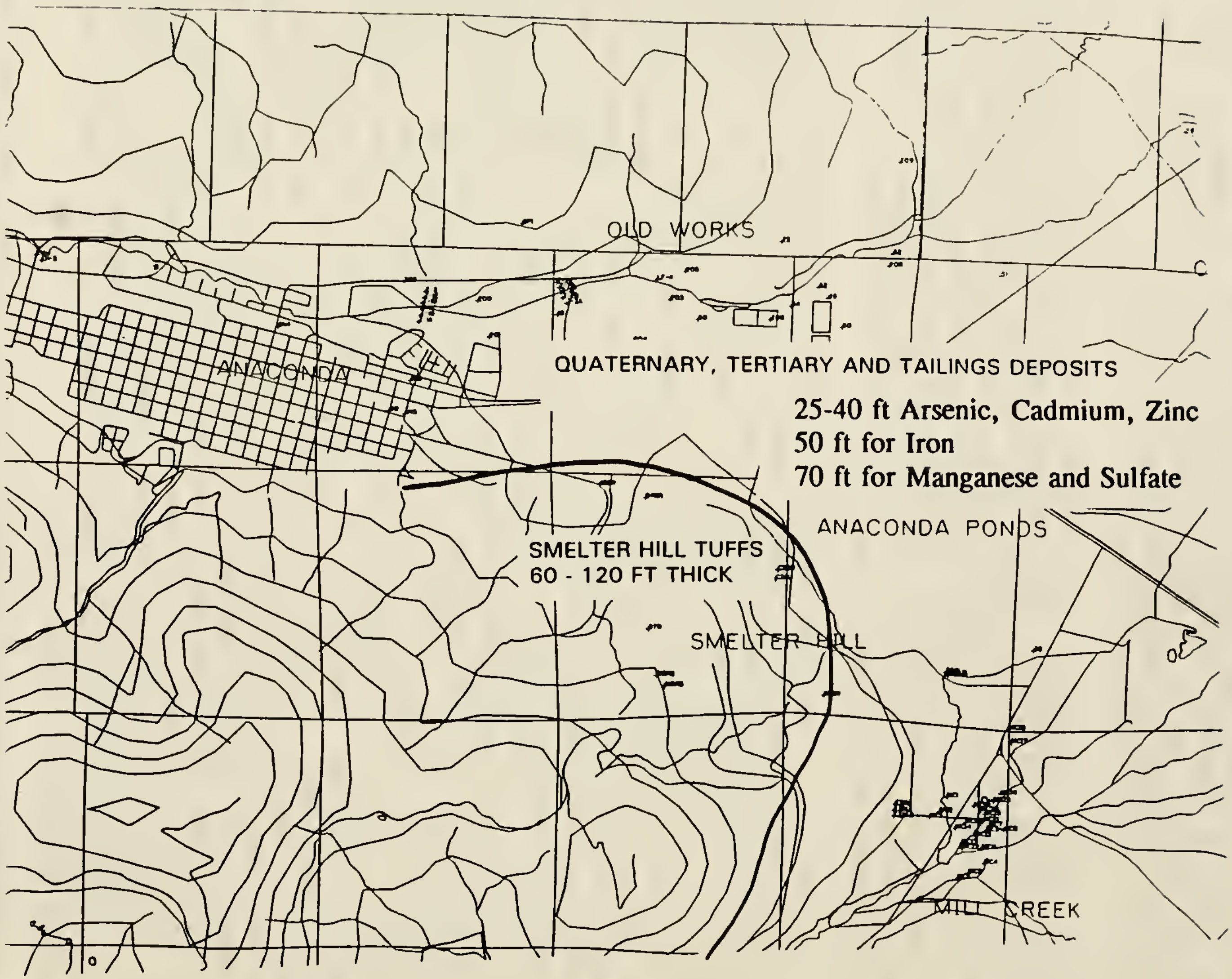
OLD WORKS
ANACONDA
QUATERNARY, TERTIARY AND TAILINGS DEPOSITS
25-40 ft Arsenic, Cadmium, Zinc
50 ft for Iron
70 ft for Manganese and Sulfate
ANACONDA PONDS
SMELTER HILL TUFFS
60 - 120 FT THICK
SMELTER HILL
MILL CREEK

Figure 43: Estimated saturated thickness of Smelter Hill tuffs, and unconsolidated sediments and tailings. The solid black line was used as the boundary between saturated bedrock and the adjacent wastes and sediments for volume calculations.

porosities, 0.20 and 0.35 (Table 17)(Todd, 1959). It is assumed that these materials have porosity values which fall within the range stated. The volume of contaminated groundwater in the Smelter Hill region was calculated using a range of porosities for the tuff in Smelter Hill, 0.14 to 0.40, which were derived from the literature (Davis and DeWiest, 1966).

The range of volume of contaminated groundwater was then calculated by summing the alluvial and bedrock values (Table 17). In addition to range values, a midpoint volume value was computed by averaging the ranges. The largest volume of groundwater exceeding drinking water standards, as represented by the midpoint values of the two modeling techniques, is contaminated with manganese, 296,800 to 453,400 acft. Finally, all individual constituent areas generated by Model1 and Model2 were superimposed and a composite area in which one or more constituent exceeded primary or secondary drinking water standards was derived for each model (Plate 8 and Figure 44). Bedrock volumes for the composite area were calculated as before and alluvial volumes were estimated using a the minimum volumes calculated for manganese and an estimate of the maximum composite volume. The maximum calculated composite volume was computed by multiplying the composite alluvial area times a thickness of 70 ft and a porosity of 0.35. These values were selected because manganese and sulfate are the dominant ions present in almost all areas affected by contamination. After multiplication by the appropriate thicknesses and porosities, range and midpoint volumes of contaminated groundwater were determined (Table 17). Based on midpoint values between 368,000 and 494,500 acft of groundwater is contaminated with hazardous substances generated at the Anaconda site, and exceeds drinking water standards. The site contamination has affected over 40 square miles of aquifer.

Three constituents of concern found in the groundwater at Anaconda are arsenic, cadmium and zinc. Figure 45 presents a map of the composite area of these hazardous substances derived from combining map areas for each constituent for both Model1 and Model2. The total area involved is about 12 mi^2 with the area associated with Smelter Hill at about 2.3 mi^2. The volume of groundwater contaminated with these three substance assuming alluvial material thickness and porosity ranges as stated above is between 87,700 acft and 111,800 acft. The midpoint value is 99,800 acft. These areas of contamination are currently principally centered in Smelter Hill, beneath Anaconda and Opportunity ponds, and in the vicinity of Warm Springs Pond 1.

Flux of Groundwater

Groundwater in the Anaconda area flows from the west to the northeast, and north from Warm Springs Ponds (Figures 15 and 16). Over 40 square miles of aquifer are impacted by metals and other constituents in the Anaconda area. Sources of recharge to the groundwater system include direct precipitation, primarily in the

TABLE 17: Estimated Volumes of Contaminated Groundwater Exceeding Drinking Water Standards Based on Model1 and Model2 Results.

Constituent	Model1		Model2	
	Range of Volume (acft)	Midpoint (acft)	Range of Volume (acft)	Midpoint (acft)
Arsenic	33,200 - 123,800	78,500	39,800 - 153,100	96,400
Cadmium	19,600 - 73,100	46,400	28,900 - 109,700	69,300
Zinc	8,700 - 29,200	19,000	9,700 - 37,500	23,600
Iron	89,500 - 175,500	132,000	168,300 - 315,900	242,100
Manganese	210,400 - 383,200	296,800	312,900 - 594,000	453,400
Sulfate	172,500 - 331,400	252,000	189,700 - 368,000	278,800
Composite All Volume*	162,300 - 525,600	344,000	208,400 - 676,100	442,200
Composite As, Cd, Zn Volume*	39,100 - 140,300	87,700	47,800 - 175,500	111,800

* combined areas with exceedence of one or more constituents

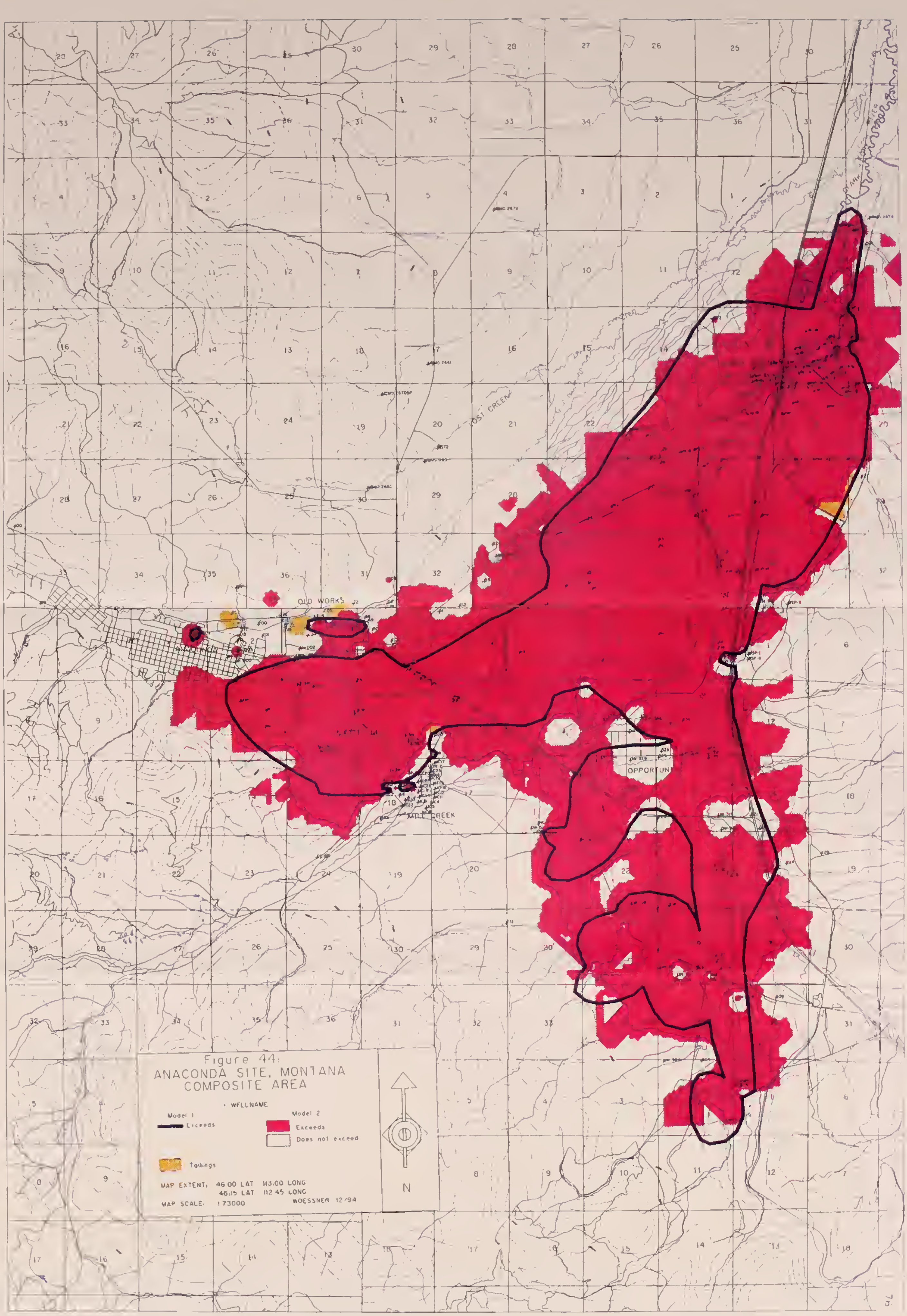

Figure 44:
ANACONDA SITE, MONTANA
COMPOSITE AREA

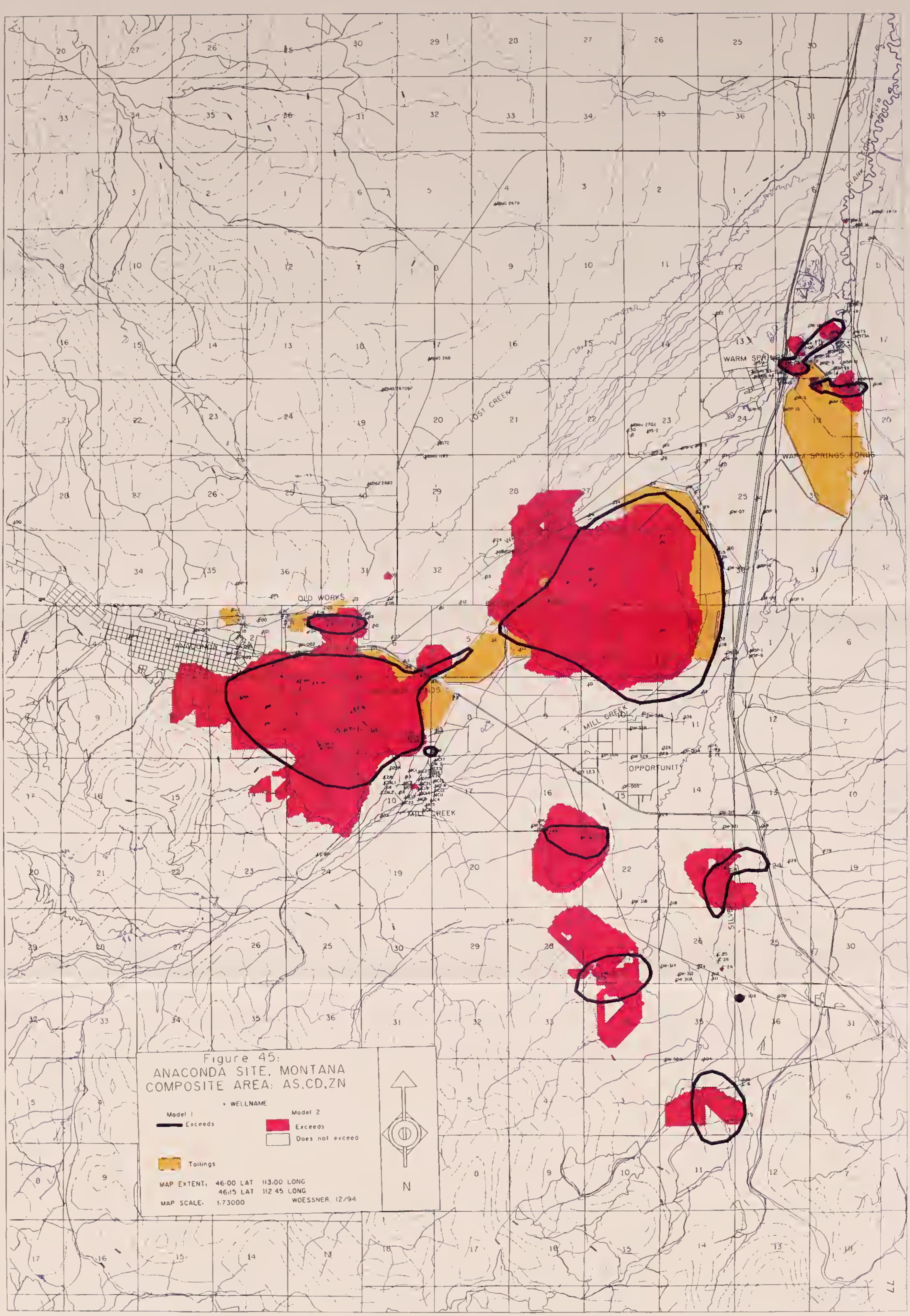

Figure 45:
ANACONDA SITE, MONTANA
COMPOSITE AREA: AS,CD,ZN

Anaconda and Opportunity Ponds area, and leakage from streams and canals. During the operation of the smelter, processing and waste water also recharged the groundwater system as described in the Hydrogeology Section of the Introduction of this report. In addition to artificial and natural recharge, lateral groundwater flow through contaminated tailings and Warm Springs Ponds sediment and berms is also causing groundwater contamination. Isolating the quantity of water flowing though the base of the Opportunity tailings is difficult as water level, tailing thickness data and hydraulic conductivity data are limited.

A combined estimate of the total quantity of contaminated groundwater flowing through the saturated tailings, underlying sand and gravel Quaternary and Tertiary sediments, from bedrock (Smelter Hill) and quantities of natural recharge contaminated with hazardous substances in the pond areas was attempted. It was made by calculating the flux of water through a cross sectional area representing the vertical and horizontal extent of contaminated groundwater in the alluvial aquifer at or near the down-gradient or east side of the Opportunity Ponds. Annual groundwater discharges were approximated by using the following assumptions: 1) the contaminated aquifer is 40 ft thick; 2) the hydraulic conductivity of the combined Tertiary and Quaternary aquifer is 145 ft/d; 3) the hydraulic gradient measured just down gradient from the Opportunity ponds is 0.008. Based on the stated assumptions, the discharge per unit width of aquifer measured at parallel to the water table contours is 0.40 ac/yr. The flux of groundwater containing each constituent exceeding drinking water standards as determined by Model1 and Model2 were then placed over a map of the June, 1992, water table surface (Figure 16). The maximum width of the mapped area of contaminated groundwater was measured parallel to the water table contours (4975 to 4900 ft) in the Opportunity Pond area (Table 18). This width was then multiplied by 0.4 acft/yr to calculate the annual discharge of contaminated groundwater flowing through the Quaternary and Tertiary sediments and tailings (Table 18).

Groundwater contamination also occurs as water seeps from Warm Springs Ponds. The sediments lying below the ponds and to the north are principally sand and gravel. A 10 ft to 15 ft thick uppermost sand and gravel unit and a lower 15 to 25 ft thick sand unit have been identified as the principal conduits of groundwater flow (MDHES and CH2M Hill, 1989). Wells finished in each of these units are contaminated north of the ponds. These two course layers are separated by a discontinuous 2 to 7 ft thick fine grained unit that may act to restrict flow. Hydraulic properties of the sand and sand and gravel have been approximated by slug test to be 5 to 50 ft/d and from aquifer test data to range from 200 to 260 ft/d. The direction of groundwater flow from the pond area is generally to the north and to the west into Mill-Willow Bypass (Figure 17). Wells finished in the two more permeable units north of the ponds generally indicate that an upward vertical gradient is present. Prior to extensive re-construction of the Mill-Willow Bypass, it was estimated that 2.5 cfs of groundwater discharged to the bypass.

TABLE 18: Results of Discharge Estimates by Constituent (acft/yr).

Constituent	Opportunity Ponds Cross Section width (ft)	Opportunity Ponds Discharge (acft/yr)	Warm Springs Ponds Cross Section width (ft)	Warm Springs Ponds Discharge (acft/yr)
Arsenic				
Model1	14,200	5,580	1,800	490
Model2	11,800	4,720	1,800	490
Cadmium				
Model1	9,000	3,600	1,000	270
Model2	9,500	3,800	600	160
Zinc				
Model1	4,400	1,760	0	0
Model2	6,400	1,730	0	0
Iron				
Model1	12,500	5,000	3,600	970
Model2	12,500	5,000	3,600	970
Manganese				
Model1	11,200	4,480	4,300	1,200
Model2	17,400	6,960	4,300	1,200
Sulfate				
Model1	17,900	7,160	4,300	1,200
Model2	18,600	7,440	4,300	1,200
Composite				
Model1	18,200	7,280	4,300	1,200
Model2	19,200	7,680	4,300	1,200
Composite As, Cd, Zn				
Model1	14,000	5,600	1,800	490
Model2	11,800	4,720	2,000	540

Current discharge is undocumented. The discharge per unit width of groundwater flowing north from the ponds was approximated by assuming a gradient between wells 19S and 12S as 0.004, hydraulic conductivity value of 200 ft/d, and an aquifer thickness of 40 ft to be 0.27 acft/(ftyr). The discharge of contaminated groundwater for each constituent was then estimated by measuring the width of the Model1 and Model2 mapped areas parallel to the Pond 1 dam, and multiplying those widths by 0.27 acft/(ftyr). Results are presented in Table 18.

The discharge of groundwater contaminated with hazardous substances and other wastes ranges between 7,280 and 7,680 acft/yr in the vicinity of Anaconda and Opportunity ponds. Of the individual constituents, the discharge of groundwater exceeding drinking water standards for manganese is the largest, 4,480 to 6,960 acft/yr. Groundwater containing arsenic, cadmium, zinc, iron, and sulfate discharges at lower rates. Groundwater that exceeds drinking water standards for arsenic, cadmium, iron, manganese and sulfate discharges from Warm Springs ponds at approximately 1,200 acft/yr.

It is recognized that groundwater mounds that formed within Opportunity and Anaconda Ponds and Smelter Hill during smelter operations. Most likely, remaining groundwater mounding will continue to decline in the future. Extremely limited data on water level changes in Opportunity ponds suggest that some type of equilibrium may be occurring as the water table rose in response to above normal precipitation in 1993 (ESE, 1994). In general, groundwater fluxes from the slowly dewatering tailings will most likely slowly decline until equilibrium is reached with the new hydrogeologic conditions in the Anaconda area.

RECOVERABILITY

More than 15 square miles of area in the Anaconda region has been impacted by wastes from the smelting of copper ore. Thousands of tons of hazardous substances and other constituents are present at the land surface, and in places, they come in direct contact with the groundwater system. Contamination of groundwater at this site has occurred because of leakage of processing and waste water from plant and disposal sites to the water table, and direct precipitation infiltration during the last 100 years.

Today, large volumes of groundwater remain contaminated (Table 17). These volumes of contaminated water are projected to slowly decline as groundwater stored in tailings during smelting operations is drained and groundwater flows down gradient. Decades may be required to eliminate the smelting related groundwater mounding in the pond areas. Under non-smelting conditions, the groundwater system will re-establish a flow system similar to pre-smelting times, however, the water table will be higher and the groundwater discharge will be larger because of the addition of annual recharge that occurs at the un-vegetated tailings pond surfaces.

In addition to groundwater contamination caused by active ore processing, natural recharge through the tailings material and leakage from Warm Springs Ponds continue to release contaminants into the underlying groundwater and are transported down gradient. Tetra Tech (1986) attempted to predict the long term impacts of leaving the mining wastes undisturbed. They assumed the active oxidizing zone in the tailings will reach the bottom of the deeper part of the Opportunity Ponds in approximately 20,000 years and the bottom of the Anaconda Ponds in 50,000 years. Oxygen will have permeated the pond sediments, the oxidation of pyrite will continue, and acid drainage with high levels of metals will occur for hundreds to thousands of years. They predict the arsenic and metal releases from the ponds will overpower the ability of the aquifer to attenuate the further migration of arsenic and metals from the waste material. Thus, the arsenic and metal plumes now present under the ponds will expand and migrate down-gradient discharging to the Mill-Willow By Pass and the Clark Fork River. The continued infiltration of water, the presence of hundreds of tons of readily mobilized contaminants and the slow primary mineral weathering process will result in the continued release of metals for thousands of years (TETRA TECH, 1986).

Seepage from Warm Springs Ponds will also continue as long as no permeability controls are implemented at the pond site. Groundwater contamination in the Warm Springs area will continue indefinitely.

SUMMARY AND CONCLUSIONS

More than 15 square miles of land associated with the smelting process in the vicinity of Anaconda, Montana, are contaminated with metals and other hazardous materials. Over 40 square miles of aquifer material are contaminated with metals and other constituents. Thousands of tons of wastes are located on the land surface and in the ponds at Warm Springs. Median concentrations of constituents found in groundwater beneath and adjacent to smelting facilities and waste piles exceed drinking water standards for arsenic, cadmium, iron, manganese, sulfate, and zinc. Volumes of groundwater with one or more constituents which exceed drinking water standards range between, 368,000 and 494,500 arc/ft. Approximately 7,280 to 7, 680 acft of contaminated groundwater discharges from the Opportunity Ponds area each year. Discharge of contaminated groundwater from the Warm Springs Pond #1 is estimated to be approximately 1,200 acft/yr.

Contamination of the groundwater in the Anaconda region is a direct result of smelting operations and mining in the Butte area. Water quality degradation observed today is both a remnant of past actions and present day conditions. Impacts are long term, as natural hydrologic processes will continue to mobilize the seemingly inexhaustible supply of contaminants for thousands of years.

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APPENDIX A

Statistical Summary of Wastes found in Upper and Lower Old Works (PTI, 1991).

TABLE B-2. SUMMARY OF OLD WORKS WASTE VOLUMES AND AREAS

Site	Feature	Surface Area (acres)	Volume (cubic yards)
Waste Piles	Waste Pile No. 1	0.19	3,950
	Waste Pile No. 2	0.44	2,850
	Waste Pile No. 3	0.09	640
	Waste Pile No. 4	0.11	920
	Waste Pile No. 5	2.88	19,970
	Waste Pile No. 6	0.05	310
	Waste Pile No. 7	0.22	2,320
	Waste Pile No. 8	0.15	820
	Total	4.13	31,780
Upper and Lower Works Structural Areas	--	NC[a]	NC
Heap roast slag	Northern heap roast slag pile	7.04	174,830
	Southern heap roast slag pile	6.43	123,560
	Total	13.47	298,390
Floodplain wastes	Wastes in modified 100-year floodplain	NC	256,500
	Total wastes in study area[b]		
	- Jig tailings	71.8	NC
	- Heap roast slag[c]	8.3	NC
	- Mixed waste and soil	20.3	NC
	- Total	100.4	440,000
Red sands	Above ground level	21.0	283,700
	Below ground level	NC	323,000
	Total	21.0	606,700
Waste ponds	West and East pond	5.47	8,050
Flues	Flue Nos. 1-6	NC	NC
	Total[d]	136	1,384,920

[a] Not calculated.

[b] Includes the southern heap roast slag pile and adjacent dispersed surface slag.

[c] Includes the area between Cedar Street and the city dump road; excludes waste piles.

[d] Sum of total wastes in floodplain, Red Sands, Waste Piles 1-8, heap roast slag piles, and the waste ponds.

TABLE B-3. STATISTICAL SUMMARY OF WASTE PILE SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation	Regulatory Limits
WASTE PILES 1-8[b]							
Arsenic	All samples	mg/kg	41	4.2-8,110	1,018	1,651	--[c]
	Waste	mg/kg	23	210-8,110	1,595	2,001	--
	Soil	mg/kg	18	4.2-1,300	280.8	345	--
Cadmium	All samples	mg/kg	41	0.4-11.2	2.4	2.4	--
	Waste	mg/kg	23	0.4-11.2	2.9	2.7	--
	Soil	mg/kg	18	0.4-6.2	1.7	1.7	--
Copper	All samples	mg/kg	41	22.2-32,100	7,791	7,272	--
	Waste	mg/kg	23	1280-32,100	8,586	6,969	--
	Soil	mg/kg	18	22.2-29,600	6,775	7,521	--
Lead	All samples	mg/kg	41	8.4-990	185.1	214	--
	Waste	mg/kg	23	81-990	279.1	231.8	--
	Soil	mg/kg	18	8.4-423	64.9	99.7	--
Zinc	All samples	mg/kg	41	51-1,660	532	426	--
	Waste	mg/kg	23	112-1,660	672.8	468.6	--
	Soil	mg/kg	18	51-972	352.1	274.7	--
Radium-226	All samples	pCi/g	9	0.9-5	1.9	1.2	--
pH	All samples	--[d]	41	2.5-7.7	5.7	1.5	--
	Waste	--	23	2.5-7.7	5.6	1.7	--
	Soil	--	18	3.3-7.7	5.7	1.3	--
EC[e]	All samples	μmho/cm	41	150-7,900	2,457	1,959	--
	Waste	μmho/cm	23	150-7,900	3,059	2,359	--
	Soil	μmho/cm	18	640-2,988	1,689	761.4	--
WASTE PILE NO. 1							
Arsenic	All samples	mg/kg	5	212-1640	605	--	--
Cadmium	All samples	mg/kg	5	2.8-8.4	4.6	--	--
Copper	All samples	mg/kg	5	5,160-32,100	11,151	--	--
Lead	All samples	mg/kg	5	87.9-332	170	--	--
Zinc	All samples	mg/kg	5	420-1,460	814.5	--	--

TABLE B-3. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation	Regulatory Limits
WASTE PILE NO. 2							
Arsenic	All samples	mg/kg	5	86-1,840	811.4	--	--
Cadmium	All samples	mg/kg	5	0.6-4.4	1.4	--	--
Copper	All samples	mg/kg	5	190-12,700	5,310	--	--
Lead	All samples	mg/kg	5	11.5-188	82.9	--	--
Zinc	All samples	mg/kg	5	51-465	194.6	--	--
TCLP[f] arsenic	All samples	mg/L	2	0.527-1.49	1.000	--	5.0[g]
TCLP barium	All samples	mg/L	2	0.202-0.227	0.215	--	100
TCLP cadmium	All samples	mg/L	2	0.013-0.033	0.023	--	1.0
TCLP chromium	All samples	mg/L	2	0.003-0.003	0.003	--	5.0
TCLP lead	All samples	mg/L	2	0.024-0.029	0.027	--	5.0
TCLP mercury	All samples	mg/L	2	0.001-0.002	0.002	--	0.2
TCLP selenium	All samples	mg/L	2	0.040-0.040	0.04	--	1.0
TCLP silver	All samples	mg/L	2	0.004-0.004	0.004	--	5.0
WASTE PILE NO. 3							
Arsenic	All samples	mg/kg	4	7.6-1,290	603.6	--	--
Cadmium	All samples	mg/kg	4	0.6-11.2	4.3	--	--
Copper	All samples	mg/kg	4	22.2-11,700	5,786	--	--
Lead	All samples	mg/kg	4	12.6-423	223.3	--	--
Zinc	All samples	mg/kg	4	62.5-1,210	571.9	--	--
WASTE PILE NO. 4							
Arsenic	All samples	mg/kg	5	476-1410	780.6	--	--
Cadmium	All samples	mg/kg	5	1.1-4.7	2.5	--	--
Copper	All samples	mg/kg	5	8,090-15,900	10,964	--	--
Lead	All samples	mg/kg	5	94.1-403	241.6	--	--
Zinc	All samples	mg/kg	5	378-1,660	959.2	--	--
WASTE PILE NO. 5							
Arsenic	All samples	mg/kg	9	4.2-5,680	1,100	--	--
Cadmium	All samples	mg/kg	9	0.6-5.5	2.3	--	--
Copper	All samples	mg/kg	9	56.4-29,600	7,356.3	--	--
Lead	All samples	mg/kg	9	8.4-688	247.8	--	--
Zinc	All samples	mg/kg	9	120-1,470	454.5	--	--
TCLP arsenic	All samples	mg/L	2	0.03-0.041	0.036	--	5.0
TCLP barium	All samples	mg/L	2	0.383-0.42	0.401	--	100
TCLP cadmium	All samples	mg/L	2	0.003-0.041	0.022	--	1.0
TCLP chromium	All samples	mg/L	2	0.003-0.003	0.003	--	5.0

TABLE B-3. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation	Regulatory Limits
TCLP lead	All samples	mg/L	2	0.020-0.020	0.02	--	5.0
TCLP mercury	All samples	mg/L	2	0.0002-0.0002	0.0002	--	0.2
TCLP selenium	All samples	mg/L	2	0.040-0.040	0.04	--	1.0
TCLP silver	All samples	mg/L	2	0.004-0.004	0.004	--	5.0
WASTE PILE NO. 6							
Arsenic	All samples	mg/kg	6	21.6-8,110	2,716	--	--
Cadmium	All samples	mg/kg	6	0.4-2.3	0.9	--	--
Copper	All samples	mg/kg	6	1,050-19,400	11,353	--	--
Lead	All samples	mg/kg	6	12.6-140	70.5	--	--
Zinc	All samples	mg/kg	6	55.3-449	210.7	--	--
TCLP arsenic	All samples	mg/L	2	0.041-0.215	0.128	--	5.0
TCLP barium	All samples	mg/L	2	0.138-0.351	0.245	--	100
TCLP cadmium	All samples	mg/L	2	0.004-0.058	0.031	--	1.0
TCLP chromium	All samples	mg/L	2	0.003-0.003	0.003	--	5.0
TCLP lead	All samples	mg/L	2	0.016-0.023	0.02	--	5.0
TCLP mercury	All samples	mg/L	2	0.0002-0.0002	0.0002	--	0.2
TCLP selenium	All samples	mg/L	2	0.040-0.040	0.04	--	1.0
TCLP silver	All samples	mg/L	2	0.004-0.004	0.004	--	5.0
WASTE PILE NO. 7							
Arsenic	All samples	mg/kg	4	6.2-814	292.4	--	--
Cadmium	All samples	mg/kg	4	0.4-2.1	1.1	--	--
Copper	All samples	mg/kg	4	1,940-8,040	4,548	--	--
Lead	All samples	mg/kg	4	9.6-990	277.4	--	--
Zinc	All samples	mg/kg	4	198-946	622	--	--
WASTE PILE NO. 8							
Arsenic	All samples	mg/kg	3	210-416.8	323.6	--	--
Cadmium	All samples	mg/kg	3	0.4-6.2	2.7	--	--
Copper	All samples	mg/kg	3	1,840-2,718	2,213	--	--
Lead	All samples	mg/kg	3	123-185	152.8	--	--
Zinc	All samples	mg/kg	3	450-757	613.6	--	--

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: PTI (1990).

[c] Regulatory limits do not exist.

[d] Unitless.

[e] EC = electrical conductivity.

[f] TCLP = Toxicity characteristic leaching procedure.

[g] From 40 CFR 261.24 (maximum toxicity characteristic concentration).

TABLE B-4. STATISTICAL SUMMARY OF UPPER AND LOWER WORKS STRUCTURAL AREA SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
UPPER WORKS STRUCTURAL AREA[b]						
Arsenic	All samples	mg/kg	30	26.1-1,340	445.3	371.8
	0-6 inches	mg/kg	15	76.1-1,340	552.5	384.6
	18-24 inches	mg/kg	15	26.1-1,200	338	324.9
Cadmium	All samples	mg/kg	30	0.85-20	7.0	5.9
	0-6 inches	mg/kg	15	1.3-20	9.0	5.5
	18-24 inches	mg/kg	15	0.9-18.3	5.0	5.6
Copper	All samples	mg/kg	30	35.9-19,800	5,208	5,633
	0-6 inches	mg/kg	15	217-19,800	5,968	5,902
	18-24 inches	mg/kg	15	35.9-15,800	4,449	5,241
Lead	All samples	mg/kg	30	8.5-1,740	243.1	415.3
	0-6 inches	mg/kg	15	25.9-1,670	280.2	395.9
	18-24 inches	mg/kg	15	8.5-1,740	206	430.6
Zinc	All samples	mg/kg	30	25.6-39,800	3,416	9,639
	0-6 inches	mg/kg	15	64.8-38,200	3,396	9,380
	18-24 inches	mg/kg	15	25.6-39,800	3,436	9,891
Radium-226	All samples	pCi/g	15	0.6-8.9	2.0	2.2
pH	All samples	--	30	6-8.7	7.7	0.7
	0-6 inches	--	15	6.3-8.6	7.8	0.7
	18-24 inches	--	15	6-8.7	7.6	0.7
EC[c]	All samples	µmho/cm	30	45-2,800	537.4	661
	0-6 inches	µmho/cm	15	45-1,600	337	440.5
	18-24 inches	µmho/cm	15	46-2,800	738.1	774.2
LOWER WORKS STRUCTURAL AREA[b]						
Arsenic (XRF)[d]	0-2 inches	mg/kg	40	200-1,280	493.5	330.4
Copper (XRF)	0-2 inches	mg/kg	40	665-9,120	2,917	2,148
Lead (XRF)	0-2 inches	mg/kg	40	500-500	500	0
Zinc (XRF)	0-2 inches	mg/kg	40	1,000-12,378	1,008	38.4

TABLE B-4. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
Arsenic (CLP)	0-2 inches	mg/kg	2	1,120-1,200	1,160	--
Cadmium (CLP)	0-2 inches	mg/kg	2	1.2-12.3	6.8	--
Copper (CLP)	0-2 inches	mg/kg	2	3,400-11,700	7,550	--
Lead (CLP)	0-2 inches	mg/kg	2	358-517	437.5	--
Zinc (CLP)	0-2 inches	mg/kg	2	1,140-1,340	1,240	--
pH	0-2 inches	--	40	3.7-7.7	5.8	1.0
EC	0-2 inches	µmho/cm	40	30-1,700	290.6	446.1

a All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

b Source: PTI (1990).

c EC = electrical conductivity.

d XRF = x-ray fluorescence.

e Standard deviation not calculated because of small sample population.

TABLE B-5. STATISTICAL SUMMARY OF HEAP ROAST SLAG SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
HEAP ROAST SLAG[b]						
Arsenic	All samples	mg/kg	62	6.7-7,120	759.3	966.4
	Soil	mg/kg	14	6.7-1,670	320.6	573.1
	Waste	mg/kg	48	13.5-7,120	887.3	1,018.9
Cadmium	All samples	mg/kg	62	0.6-18.8	3	3.1
	Soil	mg/kg	14	0.6-18.8	3.7	5.1
	Waste	mg/kg	48	0.6-8.1	2.8	2.3
Copper	All samples	mg/kg	62	878-59,200	8,212	12,144
	Soil	mg/kg	14	1,480-55,600	15,611	19,119
	Waste	mg/kg	48	878-59,200	6,054.3	7,952
Lead	All samples	mg/kg	62	5-737	321.7	212.8
	Soil	mg/kg	14	5-209	29.4	52
	Waste	mg/kg	48	6.4-737	406.9	159.8
Zinc	All samples	mg/kg	62	131-15,000	5,406	3,741
	Soil	mg/kg	14	131-5,550	1,156	1,319
	Waste	mg/kg	48	184-15,000	6,646	3,281
Radium-226	All samples	pCi/g	12	3.8-12.8	9.6	3.8
pH	All samples	--[c]	62	2.5-6.7	5.2	0.9
	Soil	--	14	2.5-6.5	5.0	1.0
	Waste	--	48	2.8-6.7	5.3	0.9
EC[d]	All samples	µmho/cm	62	58-3,600	745	727.3
	Soil	µmho/cm	14	58-3,600	1,081	964.9
	Waste	µmho/cm	48	83-3,000	646.7	607.5
HEAP ROAST SLAG[e]						
Arsenic	All samples	mg/kg	2	910-1,007	958.5	--[f]
Cadmium	All samples	mg/kg	2	12.8-13.4	13.1	--
Copper	All samples	mg/kg	2	6,100-7,000	6,550	--
Lead	All samples	mg/kg	2	985-1,030	1,008	--
Zinc	All samples	mg/kg	2	17,400-18,100	17,750	--

TABLE B-5. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
EFFLUORESCENT SALTS						
Arsenic	All samples	mg/kg	5	134-1,280	391	--
Cadmium	All samples	mg/kg	5	3.2-13	8.4	--
Copper	All samples	mg/kg	5	5,010-8,680	6,428	--
Lead	All samples	mg/kg	5	48.2-365	160.7	--
Zinc	All samples	mg/kg	5	1,430-25,900	11,507	--

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: PTI (1990).

[c] Unitless.

[d] EC = electrical conductivity.

[e] Source: Tetra Tech (1987).

[f] Standard deviation not calculated because of small sample population.

TABLE B-6. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
EC[d]	All samples	µmho/cm	142	63-12,200	1,566	2,263
	Undisturbed Soil	µmho/cm	18	100-4,800	969.4	1,373
	Waste	µmho/cm	74	63-12,100	1,836	2,524
	Soil (0-6 inches)	µmho/cm	25	87-12,200	1,597	2,416
	Soil (18-24 inches)	µmho/cm	25	140-7,500	1,166	1,547
FLOODPLAIN SAMPLES[e]						
Arsenic	All samples	mg/kg	23	7.9-8,067	1,970	2,163
	Tailings	mg/kg	12	607-8,067	2,787	2,496
	Alluvium	mg/kg	11	7.9-3,160	1,079	1,210
Cadmium	All samples	mg/kg	23	0.4-172	25.8	40.1
	Tailings	mg/kg	12	4.4-172	38.5	49.4
	Alluvium	mg/kg	11	0.4-67	12	18.4
Copper	All samples	mg/kg	23	204-5,710	1,302	1,438
	Tailings	mg/kg	12	336-3,570	1,062	947.7
	Alluvium	mg/kg	11	204-5,710	1,563	1,793
Lead	All samples	mg/kg	23	8-1,310	295.3	355.8
	Tailings	mg/kg	12	22-1,310	542.8	338.1
	Alluvium	mg/kg	11	8-63	25.3	15.2
Zinc	All samples	mg/kg	23	14-1,040	196.9	240.8
	Tailings	mg/kg	12	14-1,040	295.8	296
	Alluvium	mg/kg	11	31-235	88.9	57.2

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: PTI (1990).

[c] Unitless.

[d] EC = electrical conductivity.

[e] Source: Tetra Tech (1987).

TABLE B-6. STATISTICAL SUMMARY OF FLOODPLAIN WASTE SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
FLOODPLAIN SAMPLES[b]						
Arsenic	All samples	mg/kg	142	1.9-7,100	1,084	1,189
	Undisturbed Soil	mg/kg	18	4-1,000	212.9	281.5
	Waste	mg/kg	74	45-7,100	1,377	1,166
	Soil (0-2 inches)	mg/kg	25	7.9-4,600	1,325	1,334
	Soil (18-24 inches)	mg/kg	25	1.9-4,900	602.6	1037
Cadmium	All samples	mg/kg	142	0.6-29	5.4	5
	Undisturbed Soil	mg/kg	18	0.6-10	2.8	2.3
	Waste	mg/kg	74	0.6-29	6.8	5.4
	Soil (0-2 inches)	mg/kg	25	0.6-18	5.8	5.2
	Soil (18-24 inches)	mg/kg	25	0.6-8.6	2.6	2.6
Copper	All samples	mg/kg	142	30-25,000	3,093	4,741
	Undisturbed Soil	mg/kg	18	35-2,600	979.7	756
	Waste	mg/kg	74	210-19,000	3,223	4,188
	Soil (0-2 inches)	mg/kg	25	280-22,000	4,683	6,060
	Soil (18-24 inches)	mg/kg	25	30-25,000	2,640	5,711
Lead	All samples	mg/kg	142	5-2,900	287.4	400
	Undisturbed Soil	mg/kg	18	8.6-1,100	186.6	241.7
	Waste	mg/kg	74	16-2,200	429.7	367
	Soil (0-2 inches)	mg/kg	25	9-2,900	194.1	568.2
	Soil (18-24 inches)	mg/kg	25	5-370	32.4	73.9
Zinc	All samples	mg/kg	142	22-19,000	908	2,167
	Undisturbed Soil	mg/kg	18	69-1,100	330.9	247.1
	Waste	mg/kg	74	22-19,000	1,157	2,426
	Soil (0-2 inches)	mg/kg	25	24-14,000	1,070	2,819
	Soil (18-24 inches)	mg/kg	25	30-3,500	423.2	752.7
Radium-226	All samples	pCi/g	20	0.8-9.8	3.5	2.3
pH	All samples	--[c]	142	2.1-7.6	4.6	1.5
	Undisturbed Soil	--	18	2.8-7.6	6.5	1.3
	Waste	--	74	2.1-7	4.2	1.3
	Soil (0-6 inches)	--	25	2.5-6.7	4.1	1.2
	Soil (18-24 inches)	--	25	3-7.3	4.8	1.4

TABLE B-7. STATISTICAL SUMMARY OF RED SANDS SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation	Regulatory Limits
RED SANDS[b]							
Arsenic	All samples	mg/kg	2	1,200-2,170	1,685	--[c]	--[d]
Cadmium	All samples	mg/kg	2	7.7-13.3	10.5	--	--
Copper	All samples	mg/kg	2	2,160-3,170	2,665	--	--
Lead	All samples	mg/kg	2	292-618	455	--	--
Zinc	All samples	mg/kg	2	2,420-4,640	3,530	--	--
pH	All samples	--[e]	2	3.2-3.5	3.4	--	--
RED SANDS[f]							
TCLP[g] arsenic	All samples	mg/L	2.	0.030-0.03	0.03	--	5.0[h]
TCLP barium	All samples	mg/L	2	0.215-0.285	0.25	--	100
TCLP cadmium	All samples	mg/L	2	0.007-0.037	0.022	--	1.0
TCLP chromium	All samples	mg/L	2	0.003-0.004	0.003	--	5.0
TCLP lead	All samples	mg/L	2	0.020-0.126	0.073	--	5.0
TCLP mercury	All samples	mg/L	2	0.0002-0.0002	0.0002	--	0.2
TCLP selenium	All samples	mg/L	2	0.040-0.040	0.04	--	1.0
TCLP silver	All samples	mg/L	2	0.004-0.004	0.004	--	5.0
EFFLUORESCENT SALTS[i]							
Arsenic	All samples	mg/kg	5	134-1,280	391	--	--
Cadmium	All samples	mg/kg	5	3.2-13	8.4	--	--
Copper	All samples	mg/kg	5	5,010-8,680	6,428	--	--
Lead	All samples	mg/kg	5	48.2-365	160.7	--	--
Zinc	All samples	mg/kg	5	1,430-25,900	11,507	--	--

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: Tetra Tech (1987).

[c] Standard deviation not calculated because of small sample population.

[d] Regulatory limits do not exist.

[e] Unitless.

[f] Source: PTI (1991b).

[g] TCLP = toxicity characteristic leaching procedure.

[h] From 40 CFR 261.24 (maximum toxicity characteristic concentration).

[i] Source: PTI (1990).

TABLE B-8. STATISTICAL SUMMARY OF WASTE POND SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation	Regulatory Limits
WASTE PONDS[b]							
Arsenic	All samples	mg/kg	4	1,850-4,750	3,220	--[c]	--[d]
Cadmium	All samples	mg/kg	4	4.8-8.4	6.9	--	--
Copper	All samples	mg/kg	4	2,540-5,450	3,720	--	--
Lead	All samples	mg/kg	4	616-1690	1,055	--	--
Zinc	All samples	mg/kg	4	378-882	617	--	--
pH	All samples	--[e]	4	2.0-2.4	2.2	--	--
EC	All samples	µmho/cm	4	4,790-6,970	6,260	--	--
EP-Tox[f] arsenic	All samples	mg/L	4	0.055-0.359	0.207	--	5.0[g]
EP-Tox barium	All samples	mg/L	4	0.156-0.277	0.217	--	100
EP-Tox cadmium	All samples	mg/L	4	0.046-0.071	0.059	--	1.0
EP-Tox chromium	All samples	mg/L	4	0.008-0.012	0.01	--	5.0
EP-Tox lead	All samples	mg/L	4	0.020-0.021	0.021	--	5.0
EP-Tox mercury	All samples	mg/L	4	0.0002-0.0008	0.0005	--	0.2
EP-Tox selenium	All samples	mg/L	4	0.040-0.040	0.04	--	1.0
EP-Tox silver	All samples	mg/L	4	0.004-0.004	0.004	--	5.0
WASTE PONDS[h]							
TCLP[i] arsenic	All samples	mg/L	4	0.027-0.145	0.108	--	5.0
TCLP barium	All samples	mg/L	4	0.012-0.022	0.016	--	100
TCLP cadmium	All samples	mg/L	4	0.051-0.089	0.055	--	1.0
TCLP chromium	All samples	mg/L	4	0.005-0.022	0.011	--	5.0
TCLP lead	All samples	mg/L	4	0.004-0.027	0.012	--	5.0
TCLP mercury	All samples	mg/L	4	0.0002-0.019	0.009	--	0.2
TCLP selenium	All samples	mg/L	4	0.002-0.003	0.002	--	1.0
TCLP silver	All samples	mg/L	4	0.002-0.003	0.002	--	5.0

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: PTI (1990).

[c] Standard deviation not calculated because of small sample population.

[d] Regulatory limits do not exist.

[e] Unitless.

[f] EP-toxicity.

[g] From 40 CFR 261.24 (maximum toxicity characteristic concentration).

[h] Source: PTI (1991b).

[i] TCLP = toxicity characteristic leaching procedure.

TABLE B-9. STATISTICAL SUMMARY OF FLUE SAMPLES

Analyte[a]	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
FLUE NOS. 1-6[b]						
Arsenic	All samples	mg/kg	23	68-10,400	2,860	2,655
Cadmium	All samples	mg/kg	23	0.9-398	33.5	79.2
Copper	All samples	mg/kg	23	184-37,100	12,108	8,897
Lead	All samples	mg/kg	23	17-624	179.4	137.9
Zinc	All samples	mg/kg	23	46-2,140	495	412
Radium-226	All samples	pCi/g	6	0.7-1.9	1.2	--[c]
pH	All samples	--[d]	12	6.3-8.4	7.4	0.6
EC[e]	All samples	μmho/cm	12	340-6,000	2,288	1,640
FLUE NO. 1						
Arsenic	All samples	mg/kg	5	677-2,170	1,414	--
Cadmium	All samples	mg/kg	5	4.6-13.1	9.9	--
Copper	All samples	mg/kg	5	6,750-15,200	11,634	--
Lead	All samples	mg/kg	5	72.6-179	125	--
Zinc	All samples	mg/kg	5	261-658	417	--
FLUE NO. 2						
Arsenic	All samples	mg/kg	2	68-3,400	1,734	--
Cadmium	All samples	mg/kg	2	0.9-20.5	10.7	--
Copper	All samples	mg/kg	2	184-27,100	13,642	--
Lead	All samples	mg/kg	2	30-150	90	--
Zinc	All samples	mg/kg	2	379-703	541	--
FLUE NO. 3						
Arsenic	All samples	mg/kg	2	3,090-6,100	4,595	--
Cadmium	All samples	mg/kg	2	24.5-45.6	35.1	--
Copper	All samples	mg/kg	2	5,000-37,100	21,050	--
Lead	All samples	mg/kg	2	224-395	310	--
Zinc	All samples	mg/kg	2	703-2,140	1,422	--

TABLE B-9. (Continued)

Analyte	Stratum	Units	Number of Samples	Range	Mean	Standard Deviation
FLUE NO. 4						
Arsenic	All samples	mg/kg	2	1,320-4,180	2,750	--
Cadmium	All samples	mg/kg	2	15.8-27.1	21.5	--
Copper	All samples	mg/kg	2	6,980-12,400	9,690	--
Lead	All samples	mg/kg	2	181-624	403	--
Zinc	All samples	mg/kg	2	440-594	517	--
FLUE NO. 5						
Arsenic	All samples	mg/kg	6	195-8,160	2,887	--
Cadmium	All samples	mg/kg	6	1.4-398	78.8	--
Copper	All samples	mg/kg	6	768-24,100	10,577	--
Lead	All samples	mg/kg	6	17-370	154.2	--
Zinc	All samples	mg/kg	6	46-751	373.6	--
FLUE NO. 6						
Arsenic	All samples	mg/kg	6	10,400-333	3,872	--
Cadmium	All samples	mg/kg	6	1.7-71.5	18.8	--
Copper	All samples	mg/kg	6	4,000-21,000	11,350	--
Lead	All samples	mg/kg	6	37.2-304	162.5	--
Zinc	All samples	mg/kg	6	103-827	350.2	--

[a] All metals analyses are by Contract Laboratory Program (CLP) protocols unless otherwise indicated.

[b] Source: PTI (1990) and Tetra Tech (1987).

[c] Standard deviation not calculated because of small sample population.

[d] Unitless.

[e] EC = electrical conductivity.

APPENDIX B

Statistical Summary of Wastes Found in the Smelter Hill Area
(PTI, 1991; ESE 1994)

TABLE 2. STATISTICAL SUMMARY OF CLP RESULTS FOR UNDISTURBED AREA SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	275	156	388	890	0.6	27,200	753	338
	0 – 2	85	645	1,160	1,860	44	27,200	1,631	1,041
	2 – 10	85	271	427	612	26	2,440	543	397
	10 – 24	82	93	185	314	3.7	1,250	236	152
	24 – 48	23	18	110	153	0.6	780	129	51
	> 48	--	--	--	--	--	--	--	--
CADMIUM									
	All Depths	275	0.4	6.5	22	0.2	964	21	3.8
	0 – 2	85	17	30	53	1.1	964	53	29
	2 – 10	85	2.6	8.3	14	0.2	126	13	5.7
	10 – 24	82	0.2	0.4	0.9	0.2	32	2.4	0.6
	24 – 48	23	0.2	0.3	0.4	0.2	18	1.1	0.4
	> 48	--	--	--	--	--	--	--	--
COPPER									
	All Depths	275	24	270	1,813	3.5	72,400	1,561	220
	0 – 2	85	1,513	2,620	4,455	47	72,400	4,143	2,407
	2 – 10	85	72	290	954	6.2	5,100	716	261
	10 – 24	82	12	20	40	5.0	4,150	184	31
	24 – 48	23	11	16	28	3.5	808	53	19
	> 48	--	--	--	--	--	--	--	--
LEAD									
	All Depths	275	14	44	483	3.8	6,430	353	77
	0 – 2	85	309	643	1,023	25	6430	910	570
	2 – 10	85	19	51	191	6.0	1550	184	71
	10 – 24	82	11	14	19	3.8	587	42	17
	24 – 48	23	8.3	13	17	5.5	305	25	14
	> 48	--	--	--	--	--	--	--	--
ZINC									
	All Depths	275	62	427	1,070	18	30,400	954	319
	0 – 2	85	769	1,290	2,195	83	30,400	2,233	1,325
	2 – 10	85	305	500	906	35	3,500	671	468
	10 – 24	82	40	58	89	22	1,600	166	81
	24 – 48	23	35	46	61	18	700	80	536
	> 48	--	--	--	--	--	--	--	--

-- Indicates samples were not taken at this depth.

TABLE 3. STATISTICAL SUMMARY OF PLANT–AVAILABLE METAL RESULTS FOR UNDISTURBED AREA SOILS, SORTED BY DEPTH

Analyte	Sample Depth (inches)	Number of Samples	Concentrations (mg/kg) 25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	274	20	43	111	0.2	1,730	90	39
	0 – 2	85	45	110	190	0.8	1,730	168	94
	2 – 10	85	28	64	99	5.9	305	82	56
	10 – 24	81	13	28	38	0.2	193	38	20
	24 – 48	23	0.8	4.1	22	0.2	73	13	4.0
	> 48	––	––	––	––	––	––	––	––
CADMIUM									
	All Depths	274	0.1	3.5	11	0.02	59	6.8	1.1
	0 – 2	85	6.8	13	20	0.1	59	15	11
	2 – 10	85	1.3	4.3	8.8	0.02	34	6.1	3.0
	10 – 24	81	0.02	0.03	0.2	0.02	16	0.9	0.08
	24 – 48	23	0.02	0.02	0.1	0.02	9.0	0.5	0.05
	> 48	––	––	––	––	––	––	––	––
COPPER									
	All Depths	274	3.1	92	526	0.1	9,800	356	44
	0 – 2	85	472	623	1,000	2.3	9,800	869	577
	2 – 10	85	23	132	372	0.5	1,250	218	80
	10 – 24	81	1.2	2.5	8.3	0.1	1,250	58	4.2
	24 – 48	23	0.6	1.1	2.6	0.2	318	16	1.6
	> 48	––	––	––	––	––	––	––	––
LEAD									
	All Depths	274	1.2	4.4	19	0.16	117	15	4.9
	0 – 2	85	10	19	39	0.92	104	26	18
	2 – 10	85	1.5	7.0	22	0.21	117	15	6.0
	10 – 24	81	0.7	1.3	2.3	0.19	99	5.2	1.6
	24 – 48	23	0.7	1.0	1.3	0.16	46	3.1	1.1
	> 48	––	––	––	––	––	––	––	––
ZINC									
	All Depths	274	3.9	100	211	0.03	1,310	142	33
	0 – 2	85	101	165	243	1.7	811	202	142
	2 – 10	85	75	175	261	0.27	1,310	210	124
	10 – 24	81	0.8	2.3	14	0.18	428	43	4.3
	24 – 48	23	0.5	0.7	1.5	0.03	225	16	1.3
	> 48	––	––	––	––	––	––	––	––

–– Indicates samples were not taken at this depth.

TABLE 4. STATISTICAL SUMMARY OF X-MET RESULTS FOR UNDISTURBED AREA SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	16	603	2.580	3,140	239	13,900	2.918	1,778
	0 – 2	6	1,690	3,080	3,600	719	13,900	4.583	3,175
	2 – 10	7	1,124	2.500	3,308	566	4,690	2.558	2.049
	10 – 24	3	NA[a]	443	483	239	603	428	400
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
COPPER									
	All Depths	16	1,700	6,370	14,000	183	59,200	11,069	4,661
	0 – 2	6	3,625	7,440	12,330	1,700	59,200	16,338	8,946
	2 – 10	7	4,050	6,520	14,825	1.800	27,000	11,091	8,103
	10 – 24	3	NA[a]	227	425	183	1,020	477	349
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
LEAD									
	All Depths	16	122	990	2,050	122	8,250	1,515	607
	0 – 2	6	676	2,225	2,655	122	8,250	2.827	1,615
	2 – 10	7	122	750	1,350	122	2,870	981	502
	10 – 24	3	NA[a]	122	132	122	162	135	134
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
ZINC									
	All Depths	16	1,740	6.390	11,100	647	23,100	7.589	4.842
	0 – 2	6	2,725	8.605	11,300	1.250	18,100	8.710	6,483
	2 – 10	7	2.265	6,670	10,063	1,740	23,100	8,647	6,317
	10 – 24	3	NA[a]	647	2.320	647	7,340	2,878	1,454
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--

[a] – Statistic not applicable for number of samples taken.

-- Indicates samples were not taken at these depths.

TABLE 5. STATISTICAL SUMMARY OF CLP RESULTS FOR DISTURBED AREA SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	461	40	127	503	4.8	29,300	807	164
	0 – 2	100	37	77	789	20	29,300	1,064	175
	2 – 10	110	32	60	357	4.8	21,900	519	113
	10 – 24	118	63	208	802	7.4	13,300	718	225
	24 – 48	39	44	119	811	9.8	7,450	797	191
	> 48	94	42	110	418	4.9	28,600	987	151
CADMIUM									
	All Depths	461	0.7	3.1	12	0.4	584	22	3.9
	0 – 2	100	0.8	3.0	24	0.4	482	33	4.9
	2 – 10	110	0.5	1.7	8.6	0.4	584	15	2.7
	10 – 24	118	1.1	4.8	14	0.5	489	20	4.7
	24 – 48	39	0.6	4.6	10	0.6	364	23	4.5
	> 48	94	0.6	2.6	11	0.5	266	18	3.4
COPPER									
	All Depths	461	59	200	1,598	3.3	160,000	2,877	308
	0 – 2	100	88	174	2,180	22	160,000	4,379	430
	2 – 10	110	49	102	669	8.7	122,000	2,098	186
	10 – 24	118	93	402	2,490	7.3	91,600	3,079	483
	24 – 48	39	47	348	1,485	11	25,100	1,898	349
	> 48	94	22	170	1,190	3.3	44,100	2,341	209
LEAD									
	All Depths	461	17	41	345	1.7	22,400	489	75
	0 – 2	100	22	41	415	8.2	16,400	714	98
	2 – 10	110	16	28	137	3.1	12,100	341	53
	10 – 24	118	21	81	475	2.8	22,400	576	106
	24 – 48	39	11	64	321	6.0	3,500	416	80
	> 48	94	8.8	37	334	1.7	3,590	343	53
ZINC									
	All Depths	461	99	281	1,328	8.3	61,600	2,337	395
	0 – 2	100	136	274	1,660	43	61,600	3,320	558
	2 – 10	110	90	218	735	16	18,800	1,099	288
	10 – 24	118	126	385	1,965	14	28,600	2,770	523
	24 – 48	39	76	388	1,983	28	27,400	3,491	502
	> 48	94	39	176	1,080	8.3	15,200	1,718	254

TABLE 6. STATISTICAL SUMMARY OF CLP RESULTS FOR DISTURBED AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	158	30	43	73	4.8	1,060	86	54
	Limestone	5	35	70	77	33	393	124	79
	Disturbed	122	266	755	1,995	7.4	29,300	1,999	716
	Undisturbed	176	44	163	461	4.9	9,480	647	165
CADMIUM									
	Reclaimed	158	0.6	1.1	2.2	0.4	86	3.1	1.4
	Limestone	5	0.6	1.9	5.2	0.6	40	9.8	2.8
	Disturbed	122	4.0	13	37	0.6	584	47	13
	Undisturbed	176	0.7	4.3	13	0.6	482	21	4.3
COPPER									
	Reclaimed	158	49	84	155	8.7	13,900	279	95
	Limestone	5	67	107	217	65	1,030	306	168
	Disturbed	122	708	2,345	5,235	11	160,000	7,963	2,109
	Undisturbed	176	34	198	1,410	3.3	42,700	1,757	236
LEAD									
	Reclaimed	158	16	24	38	8.8	4,400	69	28
	Limestone	5	21	37	64	20	79	46	40
	Disturbed	122	202	455	1,255	8.4	2,240	1,208	429
	Undisturbed	176	9.8	38	248	1.7	9,060	379	56
ZINC									
	Reclaimed	158	97	148	251	23	6,180	305	171
	Limestone	5	103	125	319	96	2,550	655	270
	Disturbed	122	568	1,965	8,975	43	28,600	5,505	1,964
	Undisturbed	176	48	246	1,070	8.3	61,600	2,013	278

TABLE 7. STATISTICAL SUMMARY OF PLANT-AVAILABLE METAL RESULTS FOR DISTURBED AREA SOILS, SORTED BY DEPTH

Analyte	Sample Depth (inches)	Number of Samples	Concentrations (mg/kg) 25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	114	2.7	4.7	12	0.24	177	15	5.9
	0 – 2	38	2.3	3.4	5.6	0.86	14	4.6	3.7
	2 – 10	38	1.6	3.4	6.5	0.41	68	6.2	3.4
	10 – 24	38	4.5	25	42	0.24	177	33	16
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
CADMIUM									
	All Depths	114	0.16	0.30	0.62	0.02	6.4	0.64	0.3
	0 – 2	38	0.18	0.33	0.54	0.06	1.7	0.41	0.3
	2 – 10	38	0.09	0.18	0.30	0.02	1.2	0.23	0.1
	10 – 24	38	0.20	0.68	1.85	0.02	6.4	1.27	0.6
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
COPPER									
	All Depths	114	14	25	48	0.5	6,320	172	31
	0 – 2	38	16	23	32	3.2	104	26	22
	2 – 10	38	6.2	15	25	0.5	198	21	11
	10 – 24	38	31	199	576	1.7	6,320	469	127
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
LEAD									
	All Depths	114	2.5	5.1	8.1	0.2	656	17	4.6
	0 – 2	38	3.3	5.8	8.2	1.6	23	6.5	5.5
	2 – 10	38	1.7	3.1	5.7	0.6	656	21	3.2
	10 – 24	38	2.5	5.8	13	0.2	578	24	5.7
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--
ZINC									
	All Depths	114	9.3	21	43	0.5	327	37	19
	0 – 2	38	10	15	27	3.0	69	20	16
	2 – 10	38	5.9	16	31	0.5	80	22	13
	10 – 24	38	17	55	94	0.6	327	69	36
	24 – 48	--	--	--	--	--	--	--	--
	> 48	--	--	--	--	--	--	--	--

-- Indicates samples were not taken at this depth.

TABLE 8. STATISTICAL SUMMARY OF PLANT-AVAILABLE METAL RESULTS FOR DISTURBED AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	87	1.6	3.2	6.7	0.2	68	5.9	3.2
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	25	4.3	26	41	0.2	177	36	15
	Undisturbed	--	--	--	--	--	--	--	--
CADMIUM									
	Reclaimed	87	0.1	0.2	0.4	0.02	3.1	0.3	0.2
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	25	0.1	0.7	1.4	0.02	6.4	1.2	0.5
	Undisturbed	--	--	--	--	--	--	--	--
COPPER									
	Reclaimed	87	9.4	21	32	0.5	632	38	17
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	25	34	218	617	1.9	6,320	569	164
	Undisturbed	--	--	--	--	--	--	--	--
LEAD									
	Reclaimed	87	1.9	4.5	7.1	0.4	656	12	3.7
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	25	0.9	5.2	9.9	0.2	578	29	3.8
	Undisturbed	--	--	--	--	--	--	--	--
ZINC									
	Reclaimed	87	7.2	20	32	0.5	117	24	14
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	25	9.2	56	96	1.1	327	76	34
	Undisturbed	--	--	--	--	--	--	--	--

-- Indicates samples were not taken at this depth.

TABLE 9. STATISTICAL SUMMARY OF X-MET RESULTS FOR DISTURBED AREA SOILS, SORTED BY DEPTH

Analyte	Sample Depth (inches)	Number of Samples	Concentrations (mg/kg) 25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	27	159	204	355	97	2,210	510	299
	0 – 2	4	NA[a]	176	178	137	178	167	166
	2 – 10	8	129	170	245	112	290	189	179
	10 – 24	5	171	237	448	161	1,850	594	375
	24 – 48	4	NA[a]	247	290	97	763	338	257
	> 48	6	258	1,233	2,040	197	2,210	1,212	803
COPPER									
	All Depths	27	158	208	1,355	93	7,440	1,550	466
	0 – 2	4	NA[a]	180	199	93	308	190	174
	2 – 10	8	156	180	187	127	221	179	177
	10 – 24	5	103	230	2,583	93	6,760	2,143	583
	24 – 48	4	NA[a]	647	970	132	5,320	1,687	685
	> 48	6	660	3,560	5,750	159	7,440	3,700	2,105
LEAD									
	All Depths	27	122	122	168	122	1,320	307	190
	0 – 2	4	NA[a]	122	122	122	122	122	122
	2 – 10	8	122	122	122	122	122	122	122
	10 – 24	5	122	122	281	122	1,300	400	240
	24 – 48	4	NA[a]	132	142	122	260	162	153
	> 48	6	122	668	1,185	122	1,320	697	434
ZINC									
	All Depths	27	647	647	1,758	647	14,100	2,910	1,319
	0 – 2	4	NA[a]	647	647	647	647	647	647
	2 – 10	8	647	647	647	647	647	647	647
	10 – 24	5	647	647	1,827	647	13,500	3,532	1,521
	24 – 48	4	NA[a]	1,059	1,470	647	7,120	2,471	1,447
	> 48	6	1,475	6,605	12,050	1,310	14,100	7,210	4,578

[a] Statistic not applicable for number of samples taken.

TABLE 10. STATISTICAL SUMMARY OF X-MET RESULTS FOR DISTURBED AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	8	129	148	174	112	178	150	149
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	18	200	272	641	97	2,210	672	398
	Undisturbed	--	--	--	--	--	--	--	--
COPPER									
	Reclaimed	8	156	179	199	93	308	187	178
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	18	146	277	4,340	93	7,440	2,178	680
	Undisturbed	--	--	--	--	--	--	--	--
LEAD									
	Reclaimed	8	122	122	122	122	122	122	122
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	18	122	122	297	122	1,320	400	236
	Undisturbed	--	--	--	--	--	--	--	--
ZINC									
	Reclaimed	8	647	647	647	647	647	647	647
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	18	647	979	4,670	647	14,100	3,960	1,763
	Undisturbed	--	--	--	--	--	--	--	--

-- Indicates samples for this matrix type not taken.

TABLE 11. STATISTICAL SUMMARY OF X-MET RESULTS FOR PRIMARY HPS[a] AREA SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	3,695	170	375	1,200	86	73,600	1,187	466
	0 – 2	586	180	323	1,065	86	20,900	911	430
	2 – 10	816	148	281	1,040	86	40,800	1,072	404
	10 – 24	797	192	555	1,508	86	33,300	1,316	588
	24 – 48	578	180	512	1,440	86	35,400	1,303	545
	> 48	918	143	296	1,030	86	73,600	1,278	413
COPPER									
	All Depths	3,695	179	1,270	4,513	93	118,000	4,310	1,102
	0 – 2	586	142	575	3,010	93	51,500	2,868	750
	2 – 10	816	115	1,000	4,630	93	59,400	3,936	921
	10 – 24	797	466	2,330	6,435	93	114,000	5,997	1,803
	24 – 48	578	348	1,885	5,665	93	66,100	5,145	1,519
	> 48	918	165	933	3,380	93	118,000	3,571	880
LEAD									
	All Depths	3,695	122	333	659	122	23,700	647	321
	0 – 2	586	122	122	408	122	20,000	500	258
	2 – 10	816	122	180	593	122	20,000	575	290
	10 – 24	797	122	333	833	122	20,000	712	388
	24 – 48	578	122	333	906	122	6,050	734	379
	> 48	918	122	333	530	122	23,700	694	309
ZINC									
	All Depths	3,695	647	1,330	3,800	246	92,000	3,822	1,803
	0 – 2	586	647	1,140	3,470	484	25,700	3,051	1,634
	2 – 10	816	647	1,005	3,460	484	40,200	3,148	1,588
	10 – 24	797	647	1,910	4,460	484	92,000	4,534	2,160
	24 – 48	578	647	1,545	5,530	378	90,700	4,935	2,143
	> 48	918	647	1,120	3,120	246	41,500	3,595	1,646

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[a] HPS – Handling/Process/Storage

TABLE 12. STATISTICAL SUMMARY OF X-MET RESULTS FOR PRIMARY HPS[a] AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	933	114	180	284	86	6,690	329	208
	Limestone	96	206	476	949	86	6,230	848	476
	Disturbed	1,975	413	990	2,163	86	73,600	1,855	952
	Undisturbed	691	101	145	226	86	40,800	482	179
COPPER									
	Reclaimed	933	93	180	758	93	30,100	1,307	327
	Limestone	96	1,750	3,775	7,310	93	36,700	5,431	3,213
	Disturbed	1,975	1,260	3,260	7,793	93	118,000	6,842	2,993
	Undisturbed	691	93	168	646	93	66,100	971	282
LEAD									
	Reclaimed	933	122	122	122	122	4,590	215	158
	Limestone	96	122	232	507	122	6,190	484	283
	Disturbed	1,975	333	516	1,303	122	23,700	1,027	618
	Undisturbed	691	122	122	122	122	10,900	169	131
ZINC									
	Reclaimed	933	647	647	1,000	484	29,000	1,387	931
	Limestone	96	1,000	1,880	4,030	484	34,200	4,219	2,253
	Disturbed	1,975	1,330	2,940	6,985	246	92,000	5,885	3,137
	Undisturbed	691	647	647	926	621	40,200	1,160	874

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[a] HPS – Handling/Process/Storage

TABLE 13. STATISTICAL SUMMARY OF CLP RESULTS FOR PRIMARY HPS[a] AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	59	79	182	401	3.1	2,680	369	173
	Limestone	3	NA[b]	540	1,843	125	5,750	2,138	729
	Disturbed	94	315	679	2,135	3.0	567,000	9,430	868
	Undisturbed	28	5.0	26	140	1.1	23,200	946	35
COPPER									
	Reclaimed	59	69	280	1,195	13	27,800	2,702	362
	Limestone	3	NA[b]	4,080	19,460	1,420	65,600	23,700	7,245
	Disturbed	94	862	3,385	5,295	13	67,800	8,468	2,687
	Undisturbed	28	37	292	607	12	4,590	684	222
LEAD									
	Reclaimed	59	18	65	215	5.6	2,830	259	72
	Limestone	3	NA[b]	437	735	76	1,630	714	378
	Disturbed	94	126	551	1,325	10	35,100	1,697	441
	Undisturbed	28	12	18	56	9.8	326	55	29
ZINC									
	Reclaimed	59	119	488	1,103	19	8,880	1,395	443
	Limestone	3	NA[b]	3,520	4,785	371	8,580	4,157	2,237
	Disturbed	94	740	2,600	10,650	37	42,000	6,492	2,455
	Undisturbed	28	56	212	790	31	15,200	1,124	272

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[a] HPS – Handling/Process/Storage

[b] Statistic not applicable for number of samples taken.

TABLE 14. STATISTICAL SUMMARY OF CLP RESULTS FOR PRIMARY HPS[a] AREA SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	184	108	350	1,090	1.1	567,000	5,115	316
	0 – 2	57	151	405	1,058	38	5,750	888	412
	2 – 10	22	94	164	736	21	5,200	630	226
	10 – 24	26	136	531	1,385	5.0	6,490	1,243	416
	24 – 48	25	12	294	1,635	3.1	9,550	1,482	206
	> 48	54	47	317	1,060	1.1	567,000	14,950	293
COPPER									
	All Depths	184	237	1,185	4,060	12	67,800	5,683	982
	0 – 2	57	243	1,130	4,020	42	65,600	5,371	1,117
	2 – 10	22	47	904	3,350	13	57,700	6,217	552
	10 – 24	26	195	2,380	4,400	18	54,900	5,481	1,176
	24 – 48	25	222	1,100	4,100	28	45,200	7,768	1,212
	> 48	54	324	1,135	3,520	12	67,800	4,925	902
LEAD									
	All Depths	184	31	152	687	5.6	35,100	970	162
	0 – 2	57	52	195	657	12	8,020	665	200
	2 – 10	22	17	60	504	5.6	4,250	433	88
	10 – 24	26	36	299	694	7.2	2,700	576	193
	24 – 48	25	17	107	1,358	8.7	10,300	1,544	192
	> 48	54	19	122	575	9.8	35,100	1,434	143
ZINC									
	All Depths	184	256	909	4,380	19	42,000	4,003	1,013
	0 – 2	57	443	992	4,680	67	28,000	3,354	1,233
	2 – 10	22	77	371	1,605	19	15,400	2,328	470
	10 – 24	26	205	1,471	6,605	40	17,600	4,278	1,123
	24 – 48	25	196	653	10,968	31	42,000	7,762	1,120
	> 48	54	212	1,125	3,145	32	18,200	3,497	1,022

[a] HPS – Handling/Process/Storage

TABLE 15. STATISTICAL SUMMARY OF ORGANIC AND SPECIAL ANALYSES RESULTS FOR PRIMARY HPS[a] AREA SOILS

			Concentrations (mg/kg)							
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
POLYCHLORINATED BIPHENOLS									
	Disturbed	9	0.1	0.1	0.1	0.1	1.4	0.3	
ASBESTOS (percent)									
	Disturbed	11	1.0	1.0	1.0	1.0	2.5	1.2	
CHRYSOTILE (percent)									
	Disturbed	3	1.0	1.0	1.0	1.0	1.0	1.0	
BERYLLIUM									
	Disturbed	12	1.3	1.8	2.0	0.4	4.3	1.8	
VANADIUM									
	Disturbed	8	20	38	75	17	109	49	
TRICHLOROETHENE									
	Disturbed	3	0.05	0.05	0.05	0.05	0.05	0.05	
RADIUM 226 (pCi/g)									
	Disturbed	8	4.0	7.0	53	1.1	7.5	3.5	

[a] HPS – Handling/Process/Storage

TABLE 16. STATISTICAL SUMMARY OF X-MET RESULTS FOR EAST ANACONDA YARD SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	320	99	179	573	86	6,460	578	260
	0 - 2	51	86	108	139	86	190	117	113
	2 - 10	59	86	122	175	86	1,030	173	139
	10 - 24	88	124	227	625	86	5,740	609	294
	24 - 48	86	180	432	1,235	86	6,460	859	442
	> 48	36	174	458	1,730	86	6,260	1,146	492
COPPER									
	All Depths	320	116	299	1,810	93	65,900	2,340	509
	0 - 2	51	93	105	162	93	286	134	125
	2 - 10	59	93	104	194	93	50,300	1,305	190
	10 - 24	88	176	611	1,920	93	65,900	3,471	720
	24 - 48	86	400	1,120	4,320	93	34,500	3,382	1,230
	> 48	36	376	999	2,070	132	6,810	1,904	982
LEAD									
	All Depths	320	122	122	1,080	122	60,000	1,352	349
	0 - 2	51	122	122	122	122	122	122	122
	2 - 10	59	122	122	122	122	8,440	500	175
	10 - 24	88	122	150	1,720	122	12,200	1,508	446
	24 - 48	86	145	688	1,370	122	60,000	1,993	626
	> 48	36	139	527	1,450	122	30,200	2,580	649
ZINC									
	All Depths	320	647	647	1,560	484	18,300	1,911	1,100
	0 - 2	51	647	647	647	647	1,020	688	683
	2 - 10	59	647	647	690	484	4,500	834	748
	10 - 24	88	647	714	1,630	484	10,300	1,329	1,027
	24 - 48	86	647	1,335	3,240	484	16,600	3,069	1,646
	> 48	36	647	1,255	3,080	484	18,300	4,063	1,828

TABLE 17. STATISTICAL SUMMARY OF X-MET RESULTS FOR EAST ANACONDA YARD SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	163	86	127	171	86	1,030	155	135
	Limestone	7	86	106	127	86	372	143	123
	Disturbed	119	323	742	1,613	86	6,460	1,161	722
	Undisturbed	31	86	86	265	86	6,260	660	190
COPPER									
	Reclaimed	163	93	122	233	93	5,510	321	174
	Limestone	7	130	442	504	93	14,400	2,338	481
	Disturbed	119	920	2,260	5,993	94	65,900	5,509	2,345
	Undisturbed	31	168	376	888	93	6,370	790	417
LEAD									
	Reclaimed	163	122	122	122	122	8,440	249	139
	Limestone	7	122	122	150	122	515	192	164
	Disturbed	119	640	1,300	2,550	122	30,200	2,651	1,366
	Undisturbed	31	122	133	236	122	60,000	2,433	273
ZINC									
	Reclaimed	163	647	647	647	647	1,970	718	701
	Limestone	7	647	647	740	647	1,490	821	778
	Disturbed	119	1,220	1,980	3,785	484	18,300	3,906	2,315
	Undisturbed	31	647	647	648	647	1,830	767	731

TABLE 18. STATISTICAL SUMMARY OF X-MET RESULTS FOR COAL PILE TRACK SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	1,255	110	180	717	86	65,800	833	280
	0 – 2	191	134	163	212	86	1,120	203	175
	2 – 10	344	138	191	563	86	3,800	453	273
	10 – 24	318	206	718	1,420	86	58,200	1,385	589
	24 – 48	213	86	180	801	86	62,500	1,399	291
	> 48	189	86	86	123	86	65,800	598	129
COPPER									
	All Depths	1,255	184	480	4,928	93	63,100	5,193	937
	0 – 2	191	129	179	300	93	14,600	494	231
	2 – 10	344	184	515	3,780	93	57,500	4,898	923
	10 – 24	318	1,085	5,045	15,800	93	59,900	9,867	3,809
	24 – 48	213	212	586	8,050	93	56,700	6,181	1,219
	> 48	189	149	197	321	93	63,100	1,503	278
LEAD									
	All Depths	1,255	122	167	524	122	15,700	608	285
	0 – 2	191	122	122	122	122	4,950	172	136
	2 – 10	344	122	333	955	122	7,410	708	372
	10 – 24	318	333	361	953	122	15,700	1,074	506
	24 – 48	213	122	333	333	122	13,700	502	264
	> 48	189	122	122	122	122	3,200	199	156
ZINC									
	All Depths	1,255	647	913	5,000	484	88,100	3,895	1,748
	0 – 2	191	647	647	694	647	6,730	881	767
	2 – 10	344	647	913	3,800	484	51,500	3,117	1,567
	10 – 24	318	1,500	4,890	9,345	484	43,500	6,803	3,905
	24 – 48	213	647	1,830	7,753	484	88,100	5,650	2,399
	> 48	189	647	647	717	484	25,700	1,485	884

TABLE 19. STATISTICAL SUMMARY OF X-MET RESULTS FOR COAL PILE TRACK SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	413	130	162	210	86	1,120	196	171
	Limestone	75	110	167	279	86	1,790	309	213
	Disturbed	477	299	883	1,548	86	65,800	1,833	746
	Undisturbed	290	86	86	114	86	14,600	233	121
COPPER									
	Reclaimed	413	128	201	375	93	11,500	608	268
	Limestone	75	520	1,040	3,318	119	20,900	2,932	1,282
	Disturbed	477	1,895	7,610	19,375	93	63,100	12,177	5,432
	Undisturbed	290	158	208	327	93	18,800	821	286
LEAD									
	Reclaimed	413	122	122	171	122	12,700	362	185
	Limestone	75	124	521	1,113	122	15,700	1,223	534
	Disturbed	477	333	461	1,070	122	13,700	998	589
	Undisturbed	290	122	122	122	122	2,700	157	137
ZINC									
	Reclaimed	413	647	647	812	647	9,270	971	816
	Limestone	75	647	1,050	3,030	484	16,900	2,438	1,470
	Disturbed	477	2,323	6,030	9,960	484	51,500	7,598	4,713
	Undisturbed	290	647	647	921	484	88,100	2,345	1,055

TABLE 20. STATISTICAL SUMMARY OF CLP RESULTS FOR COAL PILE TRACK SOILS, SORTED BY DEPTH

			Concentrations (mg/kg)						
Analyte	Sample Depth (inches)	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	64	51	151	294	12	5,380	423	152
	0 – 2	20	142	205	254	90	662	236	209
	2 – 10	5	108	230	301	81	670	299	238
	10 – 24	9	101	677	1,195	62	210	779	430
	24 – 48	17	48	95	190	16	5,380	761	148
	> 48	13	21	39	47	12	500	71	39
COPPER									
	All Depths	64	61	236	576	7.0	59,700	4,040	315
	0 – 2	20	68	217	348	50	7,860	763	225
	2 – 10	5	122	285	387	102	636	325	269
	10 – 24	9	478	5,210	11,150	97	15,900	6,811	2,766
	24 – 48	17	21	206	3,752	7.0	59,700	10,445	329
	> 48	13	41	133	291	17	767	215	119
LEAD									
	All Depths	64	10	25	66	3.8	3,020	275	40
	0 – 2	20	22	30	43	9.1	284	56	35
	2 – 10	5	21	58	66	19	481	131	64
	10 – 24	9	48	391	1,010	19	3,020	769	282
	24 – 48	17	5.3	15	84	3.8	2,490	512	39
	> 48	13	6.3	9.9	12	4.2	49	14	11
ZINC									
	All Depths	64	89	313	2,530	22	31,000	3,468	476
	0 – 2	20	76	198	347	36	4,440	519	208
	2 – 10	5	193	510	609	120	1,080	553	445
	10 – 24	9	825	12,200	16,925	327	28,900	10,928	4,984
	24 – 48	17	32	1,450	9,965	22	31,000	5,596	604
	> 48	13	81	111	745	32	6,700	1,181	252

LE 21. STATISTICAL SUMMARY OF CLP RESULTS FOR COAL PILE TRACK SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
lyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
SENIC	Reclaimed	25	144	198	251	81	670	237	207
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	19	61	465	1,620	48	5,380	1,034	375
	Undisturbed	20	21	39	51	12	500	75	43
PPER	Reclaimed	25	84	198	344	50	3,660	367	199
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	19	312	5,210	13,950	52	59,700	12,963	3,002
	Undisturbed	20	21	50	206	7.0	767	153	66
AD	Reclaimed	25	22	32	53	9.1	481	62	37
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	19	24	277	1,510	9.9	3,020	833	227
	Undisturbed	20	4.7	8.0	12	3.8	49	11	8
INC	Reclaimed	25	92	279	457	36	4,440	468	230
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	19	1,660	11,600	14,225	40	31,000	10,099	4,171
	Undisturbed	20	32	91	143	22	6,700	919	151

-- Indicates samples for this matrix type not taken.

TABLE 23. STATISTICAL SUMMARY OF X-MET RESULTS FOR RAILROAD BED SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	9	144	216	428	109	3,790	698	327
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	115	900	1,500	2,810	96	19,800	2,217	1,513
	Undisturbed	4	0	224	231	215	284	237	235
COPPER									
	Reclaimed	9	160	315	1,280	139	19,000	2,727	581
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	115	1,548	3,360	5,343	141	34,900	4,138	2,654
	Undisturbed	4	0	571	610	363	1,530	759	651
LEAD									
	Reclaimed	9	122	122	608	122	3,850	710	279
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	115	164	550	1,070	122	5,520	823	496
	Undisturbed	4	122	122	122	122	122	122	122
ZINC									
	Reclaimed	9	647	647	1,654	647	14,300	2,523	1,216
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	115	1,738	3,600	6,700	647	23,300	5,016	3,378
	Undisturbed	4	0	734	740	647	2,730	1,211	987

-- Indicates samples for this matrix type not taken.

TABLE 24. STATISTICAL SUMMARY OF X-MET RESULTS FOR STACK AREA SOILS, SORTED BY DEPTH

Analyte	Sample Depth (inches)	Number of Samples	Concentrations (mg/kg) 25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	All Depths	606	243	699	3,985	86	79,700	4,548	1,045
	0 – 2	116	261	678	2,180	97	25,400	2,705	870
	2 – 10	145	283	1,240	5,305	86	49,500	5,242	1,352
	10 – 24	148	279	1,290	5,950	86	56,700	6,117	1,422
	24 – 48	78	287	754	5,765	86	41,300	4,518	1,181
	> 48	119	173	344	1,080	86	79,700	3,569	576
COPPER									
	All Depths	606	132	378	1,895	93	34,900	2,252	572
	0 – 2	116	188	384	1,150	93	15,100	1,443	523
	2 – 10	145	154	674	2,783	93	25,700	2,728	756
	10 – 24	148	137	638	2,900	93	34,900	2,802	728
	24 – 48	78	143	485	1,925	93	18,400	2,555	651
	> 48	119	93	154	611	93	17,800	1,579	305
LEAD									
	All Depths	606	122	122	491	122	28,600	1,297	313
	0 – 2	116	122	122	333	122	7,410	572	223
	2 – 10	145	122	122	1,020	122	18,600	1,500	397
	10 – 24	148	122	125	1,390	122	28,600	1,890	418
	24 – 48	78	122	122	333	122	16,900	1,166	299
	> 48	119	122	122	157	122	14,300	1,105	234
ZINC									
	All Depths	606	647	802	1,920	484	15,500	1,765	1,195
	0 – 2	116	647	647	1,310	484	5,980	1,220	970
	2 – 10	145	647	856	2,278	484	11,900	1,865	1,279
	10 – 24	148	647	1,095	2,640	484	11,000	2,057	1,404
	24 – 48	78	647	755	1,880	484	10,100	1,816	1,190
	> 48	119	647	790	1,268	647	15,500	1,777	1,107

TABLE 25. STATISTICAL SUMMARY OF X-MET RESULTS FOR STACK AREA SOILS, SORTED BY SOIL MATRIX

			Concentrations (mg/kg)						
Analyte	Sample Matrix	Number of Samples	25th Percentile	Median	75th Percentile	Minimum	Maximum	Arithmetic Mean	Geometric Mean
ARSENIC									
	Reclaimed	123	180	330	971	86	13,800	1,126	463
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	255	917	3,530	14,800	86	79,700	9,167	3,3
	Undisturbed	227	186	318	829	86	24,900	1,216	444
COPPER									
	Reclaimed	123	140	224	507	93	7,410	588	301
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	255	396	1,660	7,443	93	34,900	4,508	1,6
	Undisturbed	227	93	156	493	93	11,200	621	[illegible]
LEAD									
	Reclaimed	123	122	122	122	122	3,320	227	[illegible]
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	255	333	626	4,308	122	28,600	2,808	912
	Undisturbed	227	122	122	122	122	4,500	181	[illegible]
ZINC									
	Reclaimed	123	647	647	775	484	4,230	842	[illegible]
	Limestone	--	--	--	--	--	--	--	--
	Disturbed	255	922	1,840	4,045	484	15,500	2,850	1,97
	Undisturbed	227	647	647	884	647	9,060	1,036	85

-- Indicates samples for this matrix type not taken.

Table 5-2. Statistical Summary (Geometric Means) of Soil on Smelter Hill

	Undisturbed	Disturbed		HPS		Stack Area	Railroad Beds
		Reclaimed	Non-Reclaimed	Reclaimed	Non-Reclaimed		
Depth Interval: 0 - 2"							
Arsenic	870	83	830	186	809	711	3131
Cadmium	30	2.5	19				
Copper	1820	165	2130	314	2899	432	6021
Lead	460	46	428	85	439	159	1488
Zinc	1030	308	2220	592	2841	476	5059
No. of Samples	126	28	56	245	330	114	10
Depth Interval: 2 - 10"							
Arsenic	342	50	385	129	640	917	10209
Cadmium	6	1.4	7.5				
Copper	252	82	556	190	2399	491	9897
Lead	67	28	115	54	308	177	2830
Zinc	431	184	715	322	1634	558	7158
No. of Samples	125	28	53	249	376	126	3
	94						
Depth Interval: 10 - 24"							
Arsenic	121	264	214	531	428	1299	1495
Cadmium	0.5	6.2	3.7				
Copper	28	652	253	1882	1570	694	4774
Lead	17	169	64	325	215	226	577
Zinc	74	120	323	2126	1131	714	4578
No. of Samples	107	28	53	11	63	72	4
Depth Interval: 24 - 48"							
Arsenic	51	190	126	327	374	778	
Cadmium	0.4	5.3	1.9				
Copper	19	470	174	1265	1735	458	
Lead	14	121	38	231	185	109	
Zinc	53	505	212	1435	1082	485	
No. of Samples	23	11	38	91	183	54	
Depth Interval: > 48"							
Arsenic		377	105	263	90	309	
Cadmium		9.6	1.2				
Copper		811	90	824	341	164	
Lead		236	25	164	67	55	
Zinc		1130	124	1338	362	246	
No. of Samples		10	31	158	177	52	

All concentrations in mg/kg
Source: 'PTI 1994

ESE 1994

APPENDIX C

Results of Sampling Warm Springs Pond Sediments and Floodplain Tailings (MDHES and CH2M Hill, 1989)

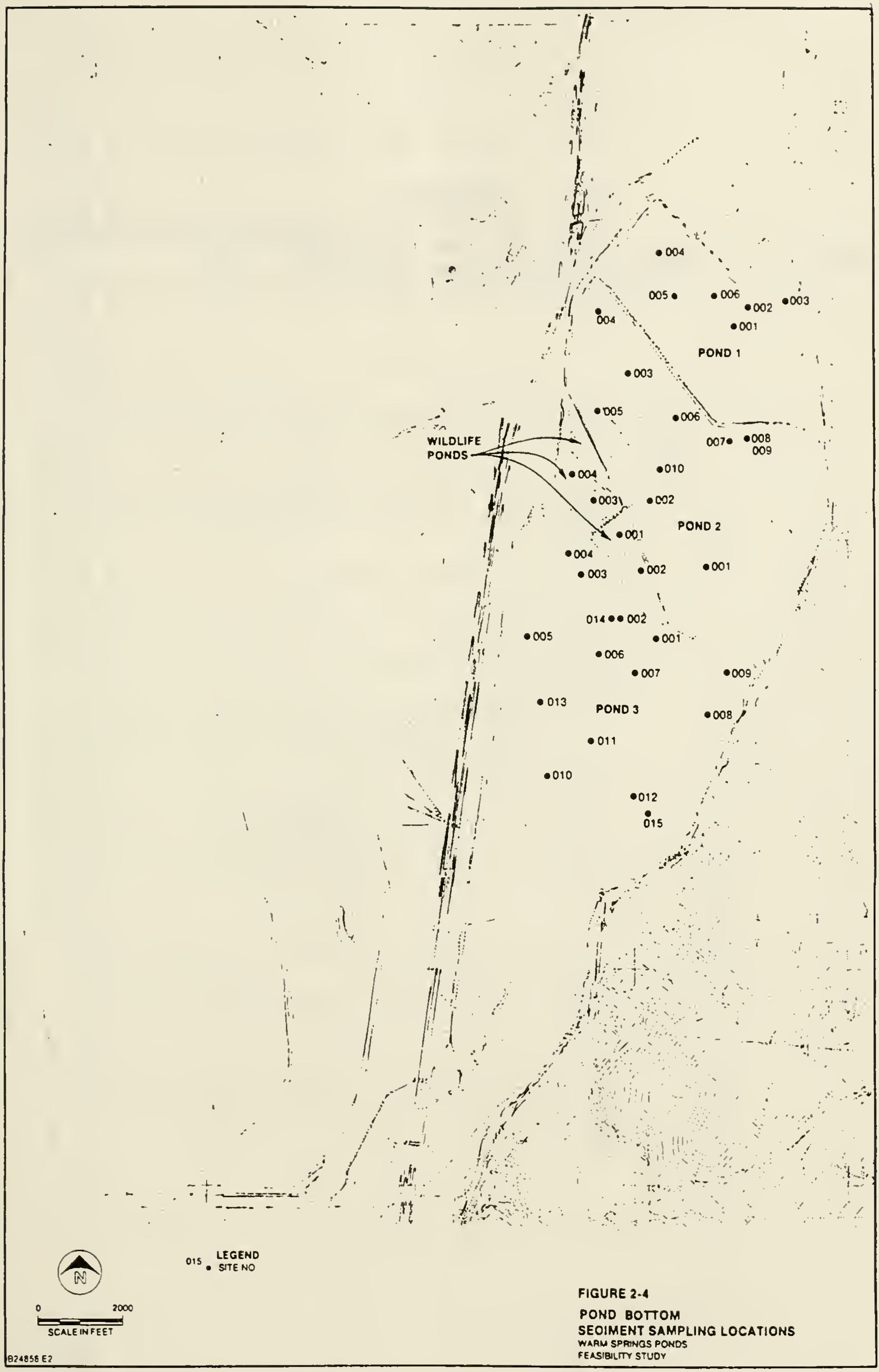

FIGURE 2-4

POND BOTTOM SEDIMENT SAMPLING LOCATIONS

WARM SPRINGS PONDS FEASIBILITY STUDY

APPENDIX C

Results of Sampling Warm Springs Pond Sediments and Floodplain Tailings (MDHES and CH2M Hill, 1989)

Table 2-5
STATISTICAL ANALYSIS OF PARAMETERS MEASURED IN POND BOTTOM SEDIMENTS

Parameters	Overall Averages for Pond 1				Overall Averages for Pond 2				Overall Averages for Pond 3				Overall Average for Wildlife Ponds				
	No. of Samples	Minimum[a]	Maximum[a]	Average[a]	No. of Samples	Minimum[a]	Maximum[a]	Average[a]	No. of Samples	Minimum[a]	Maximum[a]	Average[a]	No. of Samples	Minimum[a]	Maximum[a]	Average[a]	Background[b]
Aluminum	28	3,190	20,300	9,174	34	2,310	25,000	14,542	49	5,450	48,000	21,711	3	8,650	10,200	9,177	--
Antimony	28	7	17	10	34	7	46	14	49	7	68	30	3	8	12	9	--
Arsenic	28	6	1,850	408	34	10	1,910	590	49	18	1,630	301	3	12	94	42	10
Barium	28	47	287	199	34	99	346	243	49	61	385	157	3	133	218	173	--
Beryllium	28	0	2	1	34	0	3	1	49	0	6	2	3	0	0	0	--
Cadmium	28	1	66	10	34	1	291	36	49	1	659	195	3	1	20	8	0.4
Calcium	28	1,690	198,000	37,318	34	2,350	192,000	28,740	49	423	186,000	47,294	3	15,400	169,000	79,100	--
Chromium	28	5	76	29	34	7	71	31	49	7	52	25	3	9	14	11	--
Cobalt	28	2	19	5	34	3	104	12	49	2	155	53	3	4	9	6	--
Copper	28	19	9,390	2,886	34	62	15,700	4,661	49	107	16,400	7,015	3	50	1,160	439	35
Iron	28	4,880	119,000	51,012	34	9,400	124,000	69,344	49	7,720	248,000	98,233	3	10,100	17,300	14,200	--
Lead	28	8	1,920	670	34	10	1,670	726	49	9	680	252	3	15	126	54	25
Magnesium	28	1,230	27,700	5,864	34	1,040	32,500	6,916	49	1,960	45,550	14,992	3	5,650	24,600	13,583	--
Manganese	28	120	9,320	2,717	34	229	14,300	2,563	49	211	14,100	6,405	3	203	1,410	628	250
Mercury	28	0	6	2	34	0	8	3	49	0	6	2	3	0	1	0	--
Nickel	28	3	50	10	34	3	119	17	49	5	211	60	3	7	10	9	--
Potassium	28	928	3,210	2,040	34	163	4,510	2,575	49	211	4,280	1,809	3	1,830	3,830	2,830	--
Selenium	28	0	11	3	34	0	12	4	49	1	44	14	3	3	4	3	--
Silver	28	1	26	11	34	1	22	12	49	1	35	8	3	1	2	2	--
Sodium	28	326	1,120	512	34	341	2,210	655	49	337	4,230	1,614	3	397	558	453	--
Thallium	28	0	1	1	34	0	3	1	49	0	4	2	3	1	1	1	--
Vanadium	28	6	63	33	34	15	90	46	49	4	39	26	3	15	25	19	--
Zinc	28	70	7,900	2,212	34	49	28,200	4,859	49	114	45,800	17,319	3	77	2,380	855	60
Cyanide	28	1	1	1	34	1	4	1	49	1	6	2	3	1	1	1	--
% Solids (wt. %)	28	37.4	92.1	64.8	34	13.6	87.9	55.1	49	9.1	6,706.0	172.0	3	53.8	75.6	67.8	--
Specific Conductance (umho/cm)	28	555.0	4,180.0	1,522.8	33	173.0	2,600.0	867.8	49	224.0	2,070.0	1,119.4	3	454.0	839.0	606.7	--
pE (mV)	28	-160.0	510.0	40.2	25	-240.0	100.0	-139.2	28	-210.0	110.0	-39.5	3	-220/0	-100.0	-163.3	--
pH (pH units)	28	2.3	8.3	5.6	34	4.1	7.6	6.5	48	6.2	9.5	8.2	3	7.8	8.3	8.0	--

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[a] All units are mg/kg unless otherwise noted.
[b] From Moore, 1985.

Notes: 1. Undetected parameters are assumed to be at the detection limit.
2. Statistics are computed from the results for natural samples.

Source: CH2M HILL, 1989.

CVOR108/035.WP

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Table 2-6
SUMMARY OF POND BOTTOM SEDIMENT DATA

	COPPER			ZINC		
	n	Average Concentration (mg/kg)	Range (mg/kg)	n	Average Concentration (mg/kg)	Range (mg/kg)
POND 3						
Zone A	4	6,300	2,400-8,500	7	20,400	2,100-37,300
Zone B	18	12,000	4,500-16,400	18	27,600	3,500-45,800
Zone C	14	5,100	1,100-11,900	14	10,900	700-31,600
Zone D	11	900	20-2,100	11	900	10-3,200
POND 2						
Zone A	5	3,600	1,200-5,600	5	3,900	400-7,200
Zone B	14	5,400	1,200-15,700	14	7,100	700-28,200
Zone C	10	4,100	60-6,800	10	3,700	80-7,400
Zone D	5	4,700	200-12,500	5	1,800	50-3,600
POND 1						
Zone A	4	700	500-900	4	600	200-1,200
Zone B	10	3,100	70-9,400	10	1,400	100-6,000
Zone C	9	4,500	90-8,500	9	4,100	300-6,800
Zone D	4	400	20-1,200	4	900	70-2,400

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Table 2-6
(Continued)

	ARSENIC			CADMIUM		
	n	Average Concentration (mg/kg)	Range (mg/kg)	n	Average Concentration (mg/kg)	Range (mg/kg)
POND 3						
Zone A	7	364	181-597	7	204	6-279
Zone B	18	323	164-835	18	365	11-615
Zone C	14	425	128-1,630	14	70	3-296
Zone D	11	171	21-706	11	11	1-16
POND 2						
Zone A	5	645	438-1,050	5	25	2-46
Zone B	14	568	284-966	14	60	2-291
Zone C	10	736	10-1,910	10	20	1-83
Zone D	5	301	29-633	5	9	1-28
POND 1						
Zone A	4	376	248-465	4	2.5	1-4
Zone B	10	324	120-671	10	10.6	1-66
Zone C	9	530	31-1,010	9	15	1-23
Zone D	4	41	6-94	4	6	1-20

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Notes: 1. Data includes duplicate analyses.
2. n--number of values.

Table 2-4
SUMMARY OF TAILINGS AND SOILS DATA FOR AREAS ABOVE POND 3 AND BELOW POND 1
WARM SPRINGS PONDS AREA

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	Tailings and Contaminated Soils Average Concentrations[a] (mg/kg)	Upland Soils Average Concentrations[b] (mg/kg)	Background Concentrations[c] (mg/kg)
Aluminum	8,537	9,670	--
Antimony	14.7	6.2	--
Arsenic	593	61	10
Barium	189	150	--
Beryllium	0.84	0.68	--
Cadmium	19.1	1.0	0.4
Calcium	63,400	5,622	--
Chromium	13.9	11.2	--
Cobalt	9.1	5.2	--
Copper	18,147	342	35
Iron	56,014	15,522	--
Lead	394	125	25
Magnesium	10,999	4,498	--
Manganese	1,669	312	250
Mercury	2.5	0.14	--
Nickel	15.2	8.1	--
Potassium	1,475	4,245	--
Selenium	1.0	0.16	--
Silver	15.2	2.8	--
Sodium	900	519	--
Thallium	0.3	0.3	--
Vanadium	17.7	23.2	--
Zinc	5,223	227	60

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[a] Average concentrations from sediment samples WSP-111C, WSP-125D, WSP-134A, WSP-402A, WSP-405A, WSP-408A, and WSP-411A. Locations and analyses included in CH2M HILL, 1989. For values at the detection limit, the detection limit concentration was used in the average.

[b] Average concentrations from sediment samples WSP-100A, WSP-116A, WSP-215B, and WSP-300A. Locations and analyses included in CH2M HILL (1989). Upland soils obtained from sites above valley bottom.

[c] From Moore, 1985.

Source: CH2M HILL, 1989.

APPENDIX D

Groundwater Quality Data for Parameters Exceeding Drinking Water Standards, Anaconda Region

APPENDIX

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
1	9/14/82	5	U	5	U	50		20	U	60		50		ARCO, 1994
1	5/1/85	6.1U		4U		13.1		29		175		149		Tetra Tech, 1986
1	10/17/85	3U		2U		328		34		134		97.8		Tetra Tech, 1986
3	9/14/82	5	U	5	U	50	U	20	U	40		482		ARCO, 1994
3	4/24/85	6.1U		4U		73 3		8		32		500		Tetra Tech, 1986
3	10/18/85	4		2U		23		2		14		571		Tetra Tech, 1986
3	07/23/87	12		6		250		1080		110		62	(D)	CFUGW87A
3	07/23/87	12		5	U	280		1080		110				CFUGW87A
9	4/24/85	6.1U		4U		104		10		67		21		Tetra Tech, 1986
9	10/17/85	3U		2U		32		6		128		26.1		Tetra Tech, 1986
OP-1	12/17/85	5U		2U		22		76		285		18		Tetra Tech #4, 1986
10	9/14/82	9		5	U	73		200		60		74		ARCO, 1994
10R	4/26/85	71		2U		55.1		26		19		37		Tetra Tech #4, 1986
10R	10/16/85	3U		2U		82		23		10		39.4		Tetra Tech #4, 1986
11	9/14/82	5	U	5	U	50	U	20		70		16		ARCO, 1994
11	10/17/85	3U		2U		20U		2U		7		17		Tetra Tech, 1986
OP-3	12/17/85	5U		2U		19		59		36		17		Tetra Tech #4, 1986
16	9/14/82	5	U	5	U	100		20	U	20		680		ARCO, 1994
16	4/24/85	6.1U				346		21		174		370		Tetra Tech, 1986
16	10/15/85	3U		2U		47		14		46		44.7		Tetra Tech, 1986
18	9/14/82	5	U	5	U	50	U	20	U	260		57		ARCO, 1994
18	4/23/85	3U		4U		888		22		123		27		Tetra Tech, 1986
18	10/15/85	6.1U		2U		25		10		109		29.6		Tetra Tech, 1986
18	/ /	3	U	2	U	33		11		105				ASMGW85A
18	/ /	3	U	2	U	41		10		108				ASMGW85A
19	9/14/82	5	U	5	U	170		20	U	40		189		ARCO, 1994
19R	4/24/85	3		4U		61.2		19		29		73		Tetra Tech, 1986
19R	10/18/85	4		2U		46		25		12		815		Tetra Tech, 1986
20	2/15/85	4.6U		6 5		214		43.8		2070		47		Tetra Tech, 1985
20	2/16/85	4.6U		5.4		96		85.5		1904		63		Tetra Tech, 1985
24	9/14/82	5	U	5	U	2000		200		20		292		ARCO, 1994
24	04/24/85	6.1	UJ	4	U	820		1900		30	J	250	(D)	ASMGW85A
24	10/18/85	4		2U		515		1740		17		259		Tetra Tech, 1986
26	9/15/82	5	U	5	U	6160		35200		30		1860		ARCO, 1994
26	4/24/85	6.1U		4U		5722		35920		41		1700		Tetra Tech, 1986
26	10/18/85	4		2U		5400		36400		29		1790		Tetra Tech, 1986

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
27	9/15/82	5	U	5	U	7450		23700		30		1910		ARCO, 1994
27	4/24/85	6.1U		4U		11290		25090		13		1620		Tetra Tech, 1986
27	10/18/85	4		2U		10400		24900		23		1700		Tetra Tech, 1986
28	9/15/82	16		5	U	18600		16100		50		2010		ARCO, 1994
401	1/17/85	21		.8U		37000		NA		27U		1960		Stiller, 1985
28	10/17/85	24		2U		96000		57800		202		2190		Tetra Tech, 1986
28	4/24/85	14		4U		80140		47250		166		2110		Tetra Tech, 1986
28	05/13/93	11.9		0.11	U	17500		18800		143				ASMGW93D
29	9/15/82	5	U	5	U	4530		24400		110		2420		ARCO, 1994
340	1/17/85	44		.8U		22000		NA		70		2040		Stiller, 1985
29	4/25/85	6.1	U	4U		17680		54340		42		2060		Tetra Tech, 1986
29	10/17/85	9		2U		30900		25400		41		2180		Tetra Tech, 1986
30	9/15/82	14		6		3920		360		30		1210		ARCO, 1994
30	4/25/85	6.1U		4U		6039		116		58		1190		Tetra Tech, 1986
30	10/17/85	3		2U		2710		457		16		1240		Tetra Tech, 1986
31	9/15/82	5	U	5	U	580		240		70		1140		ARCO, 1994
31	4/25/85	6.1U		4U		248		81		64		1200		Tetra Tech, 1986
31	10/17/85	4		2U		435		52		51		1570		Tetra Tech, 1986
32	9/15/82	5	U	5	U	1580		790		20		1050		ARCO, 1994
32	9/16/82	5	U	5	U	1670		830		20		1050		ARCO, 1994
32	4/25/85	6.1U		4U		1746		42		82		669		Tetra Tech, 1986
32	10/17/85	3		2U		1830		332		36		1050		Tetra Tech, 1986
33	9/16/82	5	U	5	U	2260		520		30		143		ARCO, 1994
33	4/25/85	6.1U		4U		10810		297		30		31		Tetra Tech, 1986
33	10/17/85	3		2U		12700		316		23		42.5		Tetra Tech, 1986
34	9/16/82	5	U	10		510		290		1760		176		ARCO, 1994
34	9/16/82	5	U	9		540		270		1540		180		ARCO, 1994
34	2/15/85	4.6U		8.9		279		174		649		30		Tetra Tech, 1986
34	2/16/85	4.6U		9.4		484		166		737		35		Tetra Tech, 1986
35	9/16/82	75		5	U	50		20	U	20		157		ARCO, 1994
35	4/23/85	21		4U		786		46		12		69		Tetra Tech, 1986
35	10/15/85	27		2U		439		32		21		65		Tetra Tech, 1986
36	9/16/82	14		5	U	4720		80		500		1190		ARCO, 1994
36	4/22/85	19		4U		8366		157		634		1160		Tetra Tech, 1986
36	10/14/85	27		2U		7150		182		769		1190		Tetra Tech, 1986
37	9/16/82	5	U	5	U	4400		10100		50		1450		ARCO, 1994
37	4/22/85	6.1U		4U		16510		10960		148		1360		Tetra Tech, 1986

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
37	10/14/85	3U		2U		16600		12000		57		1380		Tetra Tech, 1986
38	9/16/82	5	U	5	U	1140		70		130		938		ARCO, 1994
39	9/16/82	5	U	5	U	120		20	U	10		252		ARCO, 1994
39	4/22/85	6.1U		4U		107		33		136		176		Tetra Tech, 1986
39	10/14/85	3U		2U		57		7		8		178		Tetra Tech, 1986
48	2/15/85	6		4U		29		1.5		982		22		Tetra Tech, 1985
48	2/16/85	4.6U		4U		23		4.7		762		NA		Tetra Tech, 1985
49	9/16/82	5	U	5	U	50	U	20	U	450		177		ARCO, 1994
49	9/16/82	5	U	5	U	50		20	U	530		180		ARCO, 1994
49	2/15/85	4.6U		4U		7.8U		13.3		126		25		Tetra Tech, 1985
49	2/16/85	4.6U		4U		9.3		27		91		27		Tetra Tech, 1985
50	2/18/85	4.6U		4U		64		53.5		87		53		Tetra Tech, 1985
50	2/18/85	4.6U		4U		58		40.4		111		49		Tetra Tech, 1985
51	9/16/82	5	U	5	U	60		20	U	40		75		ARCO, 1994
51	4/23/85	6.1U		4U		62.5		25		17		39		Tetra Tech, 1986
51	10/15/85	3U		2U		39		6		14		22.4		Tetra Tech, 1986
52	9/16/82	5	U	5	U	80		20	U	30		181		ARCO, 1994
52	2/18/85	4.6U		4U		228		37		3.3U		56		Tetra Tech, 1986
52	2/18/85	4.6U		4U		119		18.6		3.3U		56		Tetra Tech, 1986
56	9/16/82	9		106		6470		3200		2520		1060		ARCO, 1994
59	9/16/82	5	U	5	U	50	U	20	U	250		16		ARCO, 1994
59	4/24/85	6.1U		4U		47.7		3		107		15		Tetra Tech, 1986
59	10/18/85	3U		2U		20U		2U		45		15.4		Tetra Tech, 1986
60	9/16/82	5	U	5	U	50	U	20	U	40		499		ARCO, 1994
61	9/13/82	5	U	5	U	70		20	U	240		166		ARCO, 1994
62	9/13/82	5	U	5	U	50	U	20		60		858		ARCO, 1994
65	07/28/93	7.1	U	0.86	UJ	24.6	U	4.1	U	11.5				ASMGW93F
66	9/13/82	5	U	5	U	150		30		310		329		ARCO, 1994
68	07/28/93	4.1	U	0.69	UJ	22.4	U	4.1	U	10.6				ASMGW93F
69	2/18/85	2.3		4U		70		25.1		3.3U		190		Tetra Tech, 1985
69	2/18/85	12		4U		604		37.7		3.3U		190		Tetra Tech, 1985

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
69	4/24/85	6.1U		4U		142		22		42		309		Tetra Tech, 1986
69	10/15/85	3U		2U		264		24		16		215		Tetra Tech, 1986
403	1/17/85	3.3U		.8U		1600		NA		27U		1520		Stiller, 1985
70	4/23/85	6.1U		4U		2570		87		92		1440		Tetra Tech, 1986
70	10/16/85	3U		2U		2430		87		14		1160		Tetra Tech, 1986
404	1/17/85	3.3U		.8U		590		NA		27U		766		Stiller, 1985
71	4/23/85	6.1U		4U		223		28		5		1071		Tetra Tech, 1986
71	10/16/85	3U		2U		745		33		16		1160		Tetra Tech, 1986
72	4/23/85	6.1U		4U		51		20		684		63		Tetra Tech, 1986
72	10/16/85	3U		4		20		2U		641		24.3		Tetra Tech, 1986
72	3/91	2U		3U		25U		2U		591		55.1		ESE 6/91
72	9/91	2UWG		3.5		11U		1U		635		79.2		ESE 1/92
72	12/91	3.4		2.8		11U		1U		477		55.6		ESE 3/92
72	06/27/91	2	U	2	U	12	U	1	U	439				ASMGW91B
72	02/17/92	1	U	4.1		7		1	U	463				ASMGW92B
72	05/29/92	1.1		3	U	27	U	3	U	604		53.5	()	ASMGW92C
72	9/92	5.2	UB	5.1	UBP	54	UB	2.6	UB	589		52	E	ESE, 1/93
72	11/92	4.1	UBR	2.7		25	UBB	3.1	U	525		49	E	ESE, 4/93
72	02/08/93	1.6		2.7		128		128		543		0		ASMGW93B
72	02/08/93	0		2.7		0		0		0		0		ASMGW93B
72	05/11/93	1.5	U	3.7		24	U	2.6	U	502				ASMGW93D
72	07/13/93	0.98	U	2.6	U	13.5	U	2.6	U	443		84	(D)	ASMGW93E
73	5/4/85	2070		18.2		10250		4705		230		1260		Tetra Tech, 1986
73	10/25/85	840		9		2110		1050		101		758		Tetra Tech, 1986
75	4/22/85	6.1U		48.7		1965		112800		18410		1900		Tetra Tech, 1986
75	10/14/85	3U		21		2480		73600		12700		1760		Tetra Tech, 1986
75	05/19/93	0.98	U	7.9		29300		6030		477				ASMGW93D
76	4/23/85	6.1U		4U		2484		262		61		836		Tetra Tech, 1986
76	10/15/85	3U		2U		2800		235		22		865		Tetra Tech, 1986
76	9/91	2U		2U		2410E		237		2.3		784.9		ESE 1/92
76	02/18/92	1	U	3	U	2340		216		11.3	UJ			ASMGW92B
76	05/29/92	1	UJ	3	U	2040		210		5.4	U	786	()	ASMGW92C
76	9/92	3.2	JGS	5	UB	231		223		11.5	U	719	E	ESE, 1/93
76	11/92	3.1	UBB	3.9	U	2190		214		20	UBR	739	E	ESE, 4/93
76	02/04/93	2.9		2.2	U	2280		225		9		720	(D)	ASMGW93B
76	05/18/93	2.2		0.11	U	2340		226		10				ASMGW93D
76	07/19/93	2	U	2.6	U	2290		224		7.6	UJ			ASMGW93E
77	4/23/85	6.1U		4U		36		222		22		45		Tetra Tech, 1986
77	10/16/85	3U		2U		691		156		16		49.55		Tetra Tech, 1986
77	05/13/93	4.4		0.11	U	13.5	U	5		13	U			ASMGW93D

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
78	04/25/85	6.1	U	4	U	16100		48600	J	42	J			ASMGW85A
78	04/25/85	6.1	U	4	U	80.8	J	32	J	79	J			ASMGW85A
78	04/25/85	6.1	U	4	U	62.8	J	56	J	37	J			ASMGW85A
78	04/26/85	6.1	U	4	U	56.8	J	35	J	55	J	1290	(D)	ASMGW85A
78	05/02/85	6.1	U	4	UJ	26.6		14	J	12	J			ASMGW85A
78	10/16/85	3U		2U		20U		3		14		1190		Tetra Tech, 1986
78	9/91	1UWGNS		1U		13.4		3.6		4.4		1250		ESE 1/92
78	02/18/92	1	U	3	U	8.6	U	1	U	2	U			ASMGW92B
78	06/01/92	1	UJ	3	U	27	U	3	U	3.1	U	1459	()	ASMGW92C
78	9/92	3.3	UB	3.3	U	12	UBP	2	UB	25		1470	E	ESE, 1/93
78	11/92	3.4	UBR	3.9	U	32	UBB	3.1	U	30	UBP	1360	E	ESE, 4/93
78	02/10/93	6.8	UJ	2.2	U	28	U	3.9	U	38	U	0		ASMGW93B
78	05/13/93	4	J	0.11	U	16	U	4		17	U			ASMGW93D
78	07/14/93	1.7	U	2.6	U	13.5	U	2.6	U	21.4	U			ASMGW93E
79	4/24/85	6.1U		4U		119		14450		30		1260		Tetra Tech, 1986
79	10/18/85	4		2U		75		15200		28		1320		Tetra Tech, 1986
79	9/91	17.9		2U		11U		16200		8.4		1530		ESE 1/92
79	02/17/92	1	U	3	U	10.5	U	18300		3.5				ASMGW92B
79	05/29/92	1	UJ	5.3		27	U	14900		2	U	1580	()	ASMGW92C
79	9/92	1.3	UJS	3.3	UJD	10.6	UBP	16400		36.8		1720	E	ESE, 1/93
79	11/92	3.6	UBR	3.9	U	6.8	UBB	15300		37	UBP	1480	E	ESE, 4/93
79	02/10/93	6.6	UJ	2.2	U	42	U	14400		38	U	0		ASMGW93B
79	05/13/93	4.1	J	0.11	U	28	U	15800		17	U			ASMGW93D
79	07/15/93	3.5	UJ	2.6	U	11.8	U	13700		13.7				ASMGW93E
80	4/26/85	6.1U		4U		452		185		40		220		Tetra Tech, 1986
80	10/16/85	3U		2U		28		4		5		212		Tetra Tech, 1986
81	4/25/85	6.1		4U		105		2187		595		977		Tetra Tech, 1986
81	10/17/85	4		2U		56		449		31		1040		Tetra Tech, 1986
81	9/91	1UWGNS		2U		15.9		81.5		8.4		1590		ESE 1/92
81	02/17/92	1	U	3	U	32.9	U	45.9		6.4	UJ			ASMGW92B
81	05/29/92	1	UJ	3	U	27	U	39.1		2	U	1531	()	ASMGW92C
81	9/92	1.3	UJS	3.3	U	49.3	UB	61.1	JI	27.2		1620	E	ESE, 1/93
81	11/92	3	UBR	0.1	U	41	UBB	48		28	UBP	1500	E	ESE, 4/93
81	02/10/93	6.4	UJ	2.2	U	31	U	35		36	U	0		ASMGW93B
81	05/13/93	3.1	J	0.11	U	16	U	32		13	U			ASMGW93D
81	07/14/93	1.7	U	2.6	U	13.5	U	32.3		20.4	U			ASMGW93E
82	4/25/85	6.1U		4.5		2130		33290		256		2040		Tetra Tech, 1986
82	10/21/85	5U		2U		2150		35300		68		1830		Tetra Tech, 1986
84	4/25/85	587		4U		46880		26220		811		1790		Tetra Tech, 1986
84	10/21/85	410		6		43200		25300		34		1710		Tetra Tech, 1986

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
85	4/26/85	59		4U		46900		19090		206		1760		Tetra Tech, 1986
85	10/21/85	78		2U		44200		19700		34				Tetra Tech, 1986
88	5/2/85	387		5.8		28460		18810		1038		1650		Tetra Tech, 1986
88	10/21/85	640		11		31100		16600		712		1640		Tetra Tech, 1986
89	4/26/85	906		6		28850		6357		35		690		Tetra Tech, 1986
89	10/21/85	870		15		28300		6580		25		638		Tetra Tech, 1986
90	4/24/85	435		4U		27550		5590		49		50		Tetra Tech, 1986
90	10/18/85	324		2U		27700		5720		40		574		Tetra Tech, 1986
90	9/91	257		2.7		23400		5930		62.3		552		ESE 1/92
90	9/91	280		2		23100		6030		68.7		555		ESE 1/92
90	9/91	287		2U		23300		5830		70.3		554		ESE 1/92
90	02/18/92	288		3	U	22700		5310		25.8	UJ			ASMGW92B
90	05/29/92	302		3	U	20900		5070		20.3	U	557	()	ASMGW92C
90	9/92	282		5	UB	23900		5940		39		520	E	ESE, 1/93
90	11/92	255		0.1	U	19000		4890		26	UBR	560	E	ESE, 4/93
90	02/05/93	254		2.2	U	19800		4880		31		495	(D)	ASMGW93B
90	05/17/93	291		0.11	U	19700		5020		23				ASMGW93D
90	07/20/93	284		0.16	U	18400		4600		24.8				ASMGW93E
91	4/24/85	2724		20.6		165600		74710		325		2120		Tetra Tech, 1986
91	10/21/85	3600		68		188000		69000		160		2070		Tetra Tech, 1986
93	4/24/85	8177		73.4		553400		576600		24380		5340		Tetra Tech, 1986
93	10/22/85	9100		169		1720000		553000		38000		5980		Tetra Tech, 1986
94	4/25/85	81		4.2		102		4216		188		1170		Tetra Tech, 1986
94	10/18/85	3		2U		35		3920		166		1180		Tetra Tech, 1986
96	10/22/85	660		14		151		4		34		97.9		Tetra Tech, 1986
97R	10/25/85	3300		29		1970		675		449		266		Tetra Tech, 1986
98	10/22/85	400		502		38		23		58400		934		Tetra Tech, 1986
99	4/25/85	6.1U		4U		63.8		4		78		25		Tetra Tech, 1986
99	10/18/85	3		2U		26		2U		13		29.5		Tetra Tech, 1986
100	4/25/85	6.1U		4U		55.1		3		15		72		Tetra Tech, 1986
100	10/18/85	5		2U		20		2U		87		59.8		Tetra Tech, 1986
200	12/90	1.8UJL		4.3U		45.5 Q		4.8 U		19		33.1		ESE 6/91
200	11/16/90	0.21	U	2.3	U	143.5		25.6		33.4				ASMGW90A
200	3/91	2U		3U		25U		1U		10U		27.3		ESE 6/91

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
200	6/91	2U		2U		12U		1U		2U		114		ESE 9/91
200	9/91	2UWG		2U		11U		1U		9.9		46		ESE 1/92
200	12/91	2U		2U		13.4		1.4		2U		36.4		ESE 3/92
200	02/13/92	1	U	1	U	6	UJ	2	U	2	U			ASMGW92B
200	05/27/92	1	UJ	3	U	27	U	3	U	4.1		29.1	()	ASMGW92C
200	9/92	1.3	U	3.3	U	40	UBP	2		11.5	U	28	E	ESE, 1/93
200	11/92	1.3	U	3.9	U	34	UBP	3.1	U	5.7	U	28	E	ESE, 4/93
200	02/07/93	1.3	U	2.2	U	9.2	U	3.9	U	6.3	U	27	(D)	ASMGW93B
200	05/10/93	1.3	U	0.08	U	13.5	U	2.6	U	7				ASMGW93D
200	07/12/93	3.3	U	2.6	U	11.8	U	4.1	U	7.6	U			ASMGW93E
201	11/15/90	0.21	U	2.9	U	7.7	B	13.9		129.4				ASMGW90A
201	12/90	1.8UJL		4.3U		99.4 Q		10		117		24.7		ESE 6/91
201	3/91	2U		3U		25U		1U		115		25.7		ESE 6/91
201	6/91	2U		2U		12U		3.4		119		46		ESE 9/91
201	9/91	2UWG		2U		11U		1.3		120		24.8		ESE 1/92
201	12/91	2U		2U		11U		1U		72.6		22.9		ESE 3/92
201	02/14/92	1	U	1.3		6	UJ	2	U	73.6				ASMGW92B
201	05/28/92	1	UJ	3	U	27	U	3	U	102		25.9	()	ASMGW92C
201	9/92	1.8		4	UB	27	UBP	2		98		23	E	ESE, 1/93
201	11/92	1.9		3.9	U	55	UBP	3.1	U	102		21	E	ESE, 4/93
201	02/07/93	0		0.86		0		0		0				ASMGW93B
201	02/07/93	2.3		0.9		9.2	U	3.9	U	88				ASMGW93B
201	02/07/93	1.3	U	3		43	U	5	U	80				ASMGW93B
201	05/10/93	1.3	U	1		13.5	U	2.6	U	101				ASMGW93D
201	05/10/93	1.3	U	0.93		13.5	U	2.6	U	105				ASMGW93D
201	07/12/93	2.9	U	1.4	U	18.6	U	4.1	U	162				ASMGW93E
202	11/16/90	0.21	U	2.7	U	16.1	B	49.7		224.3				ASMGW90A
202	12/90	1.8UJL		4.3U		129 Q		41.2		275		26.9		ESE 6/91
202	3/91	2U		3U		25U		21.9		269		27.2		ESE 6/91
202	6/91	2U		2U		12U		10.3		327		87.3		ESE 9/91
202	9/91	2U		2U		11U		7.2		258		24.8		ESE 1/92
202	12/91	2U		2U		11U		4.2		228		23.7		ESE 3/92
202	02/13/92	1	U	1	U	6	UJ	2	U	252				ASMGW92B
202	05/27/92	1.5	J	3	U	27	U	3	U	248		31.4	()	ASMGW92C
202	9/92	4.7	UB	3.6	UBP	33.3	UBP	2.6	UB	216		25	E	ESE, 1/93
202	11/92	1.3	U	3.9	U	41	UBP	3.1	U	209		24	E	ESE, 4/93
202	02/07/93	1.6		0.7		9.2	U	4		182				ASMGW93B
202	02/07/93	0		0.7		0		0		0				ASMGW93B
202	05/10/93	1.3	U	0.8	J	23	U	5	U	194				ASMGW93D
202	07/12/93	3.6	U	2.6	U	13.3	U	4.1	U	189				ASMGW93E
203	11/13/90	1.25	U	4.7	B	17	B	21.9		2167				ASMGW90A
203	12/90	2.6JL		6.1		1070		41		2050		46.9		ESE 6/91
203	3/91	2U		3U		25U		2.2		1680		39.9		ESE 6/91
203	6/91	2U		3550		6U		795		34400		579		ESE 9/91

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
203	9/91	2U		13.5		11U		42.6		9380E		90.3		ESE 1/92
203	12/91	2U		9		11U		1.8		4180		54.1		ESE 3/92
203	02/14/92	1	U	6.8		6	UJ	2	U	2890				ASMGW92B
203	02/14/92	1	U	6.8		6	UJ	2	U	2910				ASMGW92B
203	05/28/92	1	UJ	5		27	U	3	U	2530		41.7	()	ASMGW92C
203	9/92	3.9	UB	9	UBP	23	UBP	2	U	1990		40	E	ESE, 1/93
203	11/92	1.3	U	7		46	UBP	3.1	U	1730		36	E	ESE, 4/93
203	02/08/93	1.3	U	8		15		3.9	U	2360				ASMGW93B
203	02/08/93	1.3	U	12		9.2	U	5		5240		198	(D)	ASMGW93B
203	05/11/93	1.3	UJ	6.4		29	U	3	U	3180				ASMGW93D
203	07/15/93	3.2	U	66.6		11.8	U	928		33200				ASMGW93E
204	11/13/90	1.25	U	0.4	U	15.5	B	5	B	431.1				ASMGW90A
204	12/90	1.8U		4.3U		80.4 Q		1.8U		382		33.1		ESE 6/91
204	3/91	2U		3U		25U		1U		332		28.3		ESE 6/91
204	6/91	2U		4.1		12U		19.6		2560		142		ESE 9/91
204	9/91	2U		2U		11U		1.6		867E		38.8		ESE 1/92
204	12/91	2U		2.7		11.7		1U		573		32.1		ESE 3/92
204	12/91	2U		3		5.5U		1U		510		32.1		ESE 3/92
204	02/14/92	1	U	1.3		6	UJ	2	U	372				ASMGW92B
204	05/28/92	1	UJ	3	U	27	U	3	U	424		34.4	()	ASMGW92C
204	9/92	1.3	U	5	UB	24	UBP	2	U	322		33	E	ESE, 1/93
204	11/92	1.3	U	1.3		28	UBP	3.1	U	321		31	E	ESE, 4/93
204	02/07/93	0		1.2		0		0		0		0		ASMGW93B
204	02/07/93	1.7		1.2		10	U	3.9	U	285		26	(D)	ASMGW93B
204	05/11/93	2.3	U	1.2		13.5	U	2.6	U	276				ASMGW93D
204	07/15/93	1.5	UJ	6.7		17.3	U	82.9		4730				ASMGW93E
205	9/91	4.8		2U		11U		2.7		37.5E		67.5		ESE 1/92
205	12/91	4.6		2.4		11U		1.7		92		48.1		ESE 3/92
205	02/14/92	5.2		1.1		6	UJ	2	U	62.9				ASMGW92B
205	05/28/92	5.1	J	3	U	27	U	3	U	102		50.9	()	ASMGW92C
205	9/92	7.5	UB	10	UBP	70	UB	6	UB	140		40	E	ESE, 1/93
205	11/92	6.3		4	UBR	51	UBP	3.1	U	120		41	E	ESE, 4/93
205	02/08/93	0		1.5		0		0		0		0		ASMGW93B
205	02/08/93	6.5		2.2	U	9.2	U	3.9	U	114		61	(D)	ASMGW93B
205	02/08/93	5.9		1.4		14	U	3.9	U	109		0		ASMGW93B
205	05/11/93	6.1	U	1.4		13.5	U	2.6	U	102				ASMGW93D
205	07/13/93	5.4		1.7		15.2	U	5.8	U	114				ASMGW93E
206	9/91	2U		17.8		11U		1.8		2050		67.4		ESE 1/92
206	9/91	2U		15.8		12.2		2.3		2070		67.1		ESE 1/92
206	9/91	2U		16.2		13.6		1.8		2000		67.7		ESE 1/92
206	12/91	2U		19.2		11U		1U		2230		46.4		ESE 3/92
206	02/14/92	1	U	17.9		6	UJ	2	U	1950				ASMGW92B
206	05/28/92	1	UJ	15.8		27	U	3	U	2010		44.5	()	ASMGW92C
206	9/92	7.1	UB	25.7	UJD	26.4	UBP	4.3	UB	2550		57	E	ESE, 1/93

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
206	11/92	1.6		27		53	UBP	12		2720		73	E	ESE, 4/93
206	02/08/93	1.3		13.6		9.2	U	3.9	U	1580		82	(D)	ASMGW93B
206	02/08/93	0		13.6		0		0		0		0		ASMGW93B
206	05/11/93	1.7	U	14.8		13.5	U	2.6	U	1780				ASMGW93D
206	07/15/93	3.5	UJ	26.3		14.8	U	54.7		2830				ASMGW93E
207	9/91	2U		2U		11U		2.1		2UE		97.4		ESE 1/92
207	12/91	2U		2U		11U		1.1		2U		84		ESE 3/92
207	02/17/92	1	U	3	U	17.1	U	2.1		3.4				ASMGW92B
207	05/28/92	1	UJ	3	U	27	U	3	U	2	U	85.2	()	ASMGW92C
207	9/92	5.2	UB	3.3	UJD	24.1	UBP	2	U	11.5	U	88	E	ESE, 1/93
207	11/92	1.3	U	3.9	U	41	UBP	3.1	U	6	UBR	82	E	ESE, 4/93
207	02/08/93	0		0.2		0		0		0		0		ASMGW93B
207	02/08/93	1.5		0.2	U	9.2	U	3.9	U	6.3	U	89	(D)	ASMGW93B
207	05/11/93	1.5	UJ	0.04	U	13.5	U	2.6	U	6	U			ASMGW93D
207	07/13/93	0.98	U	0.04	U	13.5	U	2.6	U	6	U			ASMGW93E
208	9/91	2U		2U		11U		1U		5		165.7		ESE 1/92
208	12/91	2U		2U		11U		1.8		2U		18.4		ESE 3/92
208	05/29/92	1	UJ	3	U	27	U	3	U	2.5	U	16.1	()	ASMGW92C
208	9/92	4.4	UB	3.8	UBP	28.7	UBP	2	U	11.5	U	14	E	ESE, 1/93
208	11/92	1.3	U	3.9	U	44	UBP	3.1	U	5.7	U	14	E	ESE, 4/93
208	02/08/93	0		0.2		0		0		0		0		ASMGW93B
208	02/08/93	1.3	U	0.2	U	9.2	U	3.9	U	6.3	U	17	(D)	ASMGW93B
208	05/11/93	2.3	U	0.14		13.5	U	2.6	U	6	U			ASMGW93D
208	07/13/93	0.98	U	2.6	U	17.6	U	5	U	6	U			ASMGW93E
209	9/91	2U		5.4		11U		4.3		519		192		ESE 1/92
209	12/91	2U		4.3		11U		1U		507		95		ESE 3/92
209	02/17/92	1	U	5		4	U	1	U	467				ASMGW92B
209	05/29/92	1	U	4.6		27	U	3	U	616		57.5	()	ASMGW92C
209	9/92	5.2	UB	6.3	UBP	33.3	UBP	2	U	492		49	E	ESE, 1/93
209	11/92	3.2	UBR	4.4		30	UBB	7		486		44	E	ESE, 4/93
209	02/08/93	1.3	UJ	8		9.2	U	3.9	U	608		99	(D)	ASMGW93B
209	05/11/93	1.3	U	4.2		60	U	4	U	484				ASMGW93D
209	07/13/93	0.98	U	9.2		15.2	U	3.3	U	1080				ASMGW93E
210	06/05/92	70.8		3	U	27	U	3.8		2	U	31.3	()	ASMGW92C
210	9/92	86.2		0.4	UB	34	UBP	2	U	11.5	U	37	E	ESE, 1/93
210	11/92	47		3.9	U	35	UBR	3.1	U	14	UBR	61	E	ESE, 4/93
210	02/03/93	102	J	2.2	U	9.2	U	3.9	U	6.3	U	0		ASMGW93B
210	05/18/93	93.5		0.63		14	U	2.6	U	17				ASMGW93D
210	07/20/93	90.2		2.6	U	11.8	U	4.1	U	7.6	U			ASMGW93E
211	07/24/92	40.9		3	U	15	U	5	U	3	U	73	()	ASMGW92C
211	9/92	44.9	JS	3.3	UJD	20.7	UBP	5.2	UB	11.5	U	75	E	ESE, 1/93
211	11/92	41		3.9	U	30	UBR	3.1	U	5.7	UBP	72	E	ESE, 4/93

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
211	02/03/93	60.3	J	2.2	U	9.2	U	3.9	U	6.3	U	48	(D)	ASMGW93B
211	05/19/93	50.3		0		19	U	5	U	7	U			ASMGW93D
211	07/20/93	61.6		2.6	U	14.7		4.1	U	7.6	U			ASMGW93E
212	06/05/92	1.1		3	U	71.2		6.9		2	U	21.8	()	ASMGW92C
212	9/92	1.9		3.3	U	45	UBP	2		11.5	U	19	E	ESE, 1/93
212	11/92	1.3	U	3.9	U	42	UBP	3.1	U	6	UBR	18	E	ESE, 4/93
212 (FR)	11/92	1.3	U	3.9	U	39	UBP	3.1	U	6	UBR	17	E	ESE, 4/93
212	02/04/93	1.9	J	2.2	U	10		3.9	U	6.3	U	17	(D)	ASMGW93B
212	05/17/93	1.3	U	0.11	U	13.5	U	2.6	U	7				ASMGW93D
212	07/15/93	2.6	U	2.6	U	11.8	U	4.2		7.6	U			ASMGW93E
213	06/05/92	1	U	3	U	27	U	7.4		1060		32.7	()	ASMGW92C
213	9/92	1.8		6	UB	155	UB	3		812		31	E	ESE, 1/93
213	11/92	1.3	U	2.3		35	UBP	3.1	U	786		27	E	ESE, 4/93
213	02/04/93	0		11		0		0		0		0		ASMGW93B
213	02/04/93	1.3		11		9.2	U	179		7510		94	(D)	ASMGW93B
213	05/17/93	1.3	U	5.3		18	U	11	U	1710				ASMGW93D
213	07/15/93	3.6	UJ	47.6		11.8	U	1020		31100				ASMGW93E
214	07/24/92	1.5	J	3.5	U	15	U	65.3		5.7	U	811	()	ASMGW92C
214	9/92	1.3	UB	3.3	UJD	34.3	UB	83.1	JI	21.4		828	E	ESE, 1/93
214	11/92	3	UBR	3.9	U	43	UBB	83		28	UBP	407	E	ESE, 4/93
214	02/10/93	4	UJ	2.2	U	22	U	82		31	U	0		ASMGW93B
214	05/13/93	1.5		0.2		13.5	U	93		12	U			ASMGW93D
214	05/13/93	2.7		0.17		13.5	U	85		8	U			ASMGW93D
214	07/14/93	1.7	U	2.6	U	15.6	U	95.8		11.8	U			ASMGW93E
215	07/22/92	2.6	J	12.5		71100		24000		418		1950	()	ASMGW92C
215	9/92	8.3		10	UB	65500		21200		344		2040	E	ESE, 1/93
215	11/92	22.3	JGS	3.9	U	66000		22000		331		1930	E	ESE, 4/93
215	02/04/93	14.1		2.2	U	79900		26200		478		1840	(D)	ASMGW93B
215	05/17/93	15.1		0.11	U	84800		27900		573				ASMGW93D
215	07/19/93	13.3		2.6	U	78100		25700		643				ASMGW93E
216	07/22/92	3.3	J	3	U	231		349		3	U	1040	()	ASMGW92C
216	9/92	5.7	JGS	4	UB	216	UB	241		18.9		945	E	ESE, 1/93
216	11/92	3.4	UBR	3.9	U	152	UBR	303		19	UBR	877	E	ESE, 4/93
216	02/04/93	6.2		2.2	U	213		374		11		809	(D)	ASMGW93B
216	07/19/93	13.2		2.6	U	645		321		8.6				ASMGW93E
217D	07/22/92	1	UJ	3	U	15	U	5	U	3	U	16	()	ASMGW92C
217D	9/92	1.3	U	5	UB	52.1	UBP	214		11.5	U	15	E	ESE, 1/93
217D	11/92	2.7	UBR	3.9	U	30	UBB	3.1	U	5.7	U	15	E	ESE, 4/93
217D	02/05/93	1.3	U	2.2	U	35	U	43		6.3	U	23	(D)	ASMGW93B
217D	05/13/93	1.5		0.04	U	13.5	U	2.6	U	6	UR			ASMGW93D
217D	07/15/93	2.7	U	2.6	U	11.8	U	4.1	U	8.1				ASMGW93E

APPENDIX

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
217S	07/22/92	229	J	3	U	26700		7010		202		909	()	ASMGW92C
217S	9/92	279		6	UB	29200		6200		176		920	E	ESE, 1/93
217S	11/92	228		3.9	U	24400		4880		130		815	E	ESE, 4/93
217S	02/05/93	0		0.11	U	0		0		0		0		ASMGW93B
217S	02/05/93	269		2.2	U	24500		4540		110		792	(D)	ASMGW93B
217S	02/05/93	259		0.1	U	24700		4590		122		801	(D)	ASMGW93B
217S	05/17/93	352		0.11	U	29600		5460		132				ASMGW93D
217S	07/19/93	339		2.6	U	32500		5810		139				ASMGW93E
218D	07/23/92	1	UJ	3	U	15	U	15400		10.4		811	()	ASMGW92C
218D	9/92	3.6	UB	1.1	UB	33	UBP	14700		11.5	U	777	E	ESE, 1/93
218D	11/92	1.6	UBB	3.9	U	21	UBP	14200		26	UBR	747	E	ESE, 4/93
218D	02/03/93	1.3	UJ	2.2	U	9.2	U	14700		26		0		ASMGW93B
218D	05/15/93	2.2		0.85		13.5	U	14300		6	U			ASMGW93D
218D	07/16/93	6.4	UJ	2.6	U	11.8	U	12900		26.4	U			ASMGW93E
218S	07/23/92	31.6	J	6.3		15	U	2920		766				ASMGW92C
218S	9/92	36.7		7.7		23	UBP	2960		742		740	E	ESE, 1/93
218S	11/92	36.1		9		39	UBR	2970		763		712	E	ESE, 4/93
218S	02/03/93	43.9		5		9.2	U	3240		793		0		ASMGW93B
218S	05/18/93	45.8		7.4		19	U	3280		839				ASMGW93D
218S	07/20/93	38.5		9.9	U	11.8	U	2750		739				ASMGW93E
219	07/23/92	1	UJ	3	U	15	U	9.8		3	U	66.3	()	ASMGW92C
219	9/92	6.2	UB	3.3	UJD	26.4	UBP	18.1	JI	17.4		271	E	ESE, 1/93
219	11/92	3.2	UBR	4	U	43	UBB	7		15	UBP	291	E	ESE, 4/93
219	02/03/93	2.2		2.2	U	9.2	U	5		6.3	U	241	(D)	ASMGW93B
219	05/15/93	1.7		0.12	U	13.5	U	8		6	U			ASMGW93D
219	07/16/93	6	U	2.6	U	11.8	U	4.1	U	9.7	U			ASMGW93E
220	07/23/92	1.2	J	3	U	15	U	5	U	3	U	91.8	()	ASMGW92C
220	9/92	4.5	UB	3.3	UJD	31	UBP	3	UB	11.5	U	42	E	ESE, 1/93
220	11/92	3.8	UBR	3.9	U	23	UBB	3.1	U	11	UBP	37	E	ESE, 4/93
220	02/09/93	1.7	U	2.2	U	22	U	3.9	U	6.3	U	0		ASMGW93B
220	05/14/93	2.1		0.04	U	13.5	U	2.6	U	6	U			ASMGW93D
220	07/16/93	6	U	2.6	U	12.3	U	4.1	U	13.8	U			ASMGW93E
221	07/23/92	4	J	3	U	15	U	73.1		3	U	97.9	()	ASMGW92C
221	07/23/92	4.1	J	3	U	15	U	73.1		3	U	97.6	()	ASMGW92C
221	9/92	1.4		3.3	U	14	UBP	19	UB	11.5	U	97	E	ESE, 1/93
221	11/92	9.6		3.9	U	25	UBB	6		6	UBP	99	E	ESE, 4/93
221 (FR)	11/92	9.3		3.9	U	34	UBB	7		9	UBP	96	E	ESE, 4/93
221	02/10/93	10.8	J	2.2	U	25	U	3.9	U	18	U	0		ASMGW93B
221	05/12/93	8.2	J	0.04	U	14	U	2.6	U	6	UR			ASMGW93D
221	07/14/93	5.9		2.6	U	13.5	U	2.6	U	7.3	U			ASMGW93E
222	07/23/92	1	UJ	3	U	15	U	15.9		3.6		541	()	ASMGW92C
222	9/92	2.3	UB	3.3	U	14	UBP	20	UB	11.5	U	531	E	ESE, 1/93

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
222	11/92	5	UBR	4		30	UBB	3.1	U	9	UBP	255	E	ESE, 4/93
222	02/10/93	6.6	UJ	2.2	U	22	U	3.9	U	20	U	0		ASMGW93B
222	05/12/93	2.9	J	0.05		19	U	2.6	U	6	UR			ASMGW93D
222	07/13/93	0.98	U	2.6	U	15.1	U	2.6	U	6	U			ASMGW93E
223	07/23/92	2.1	J	3	U	15	U	7.2		3.5		200	()	ASMGW92C
223	9/92	7.2	UB	3.3	U	9	UBP	2	U	11.5	U	199	E	ESE, 1/93
223	11/92	3.5	UBR	0.1	U	30	UBB	3.1	U	15	UBP	510	E	ESE, 4/93
223	02/08/93	4.8		2.2	U	9.2	U	3.9	U	6.3	U	0		ASMGW93B
223	05/12/93	3.2		0.08		13.5	U	2.6	U	6	UR			ASMGW93D
223	07/13/93	3.8		2.6	U	15.2	U	2.6	U	6	U			ASMGW93E
224	07/22/92	1	UJ	3	U	15	U	123		3	U	17.4	()	ASMGW92C
224	9/92	3.1	UB	3.3	UJD	34.2	UBP	110	JI	11.5	U	224	E	ESE, 1/93
224	11/92	1.9		3.9	U	51	UBP	9		6	UBR	13	E	ESE, 4/93
224	02/08/93	1.3	UJ	2.2	U	20	U	5		6.3	U	19	(D)	ASMGW93B
224	05/13/93	1.6	J	0.04		13.5	U	2.6	U	6	UR			ASMGW93D
224	07/14/93	1.7	U	2.6	U	23.4	U	5.3	U	8	U			ASMGW93E
225	07/23/92	13.7	J	3	U	15	U	145		6.9		91.4	()	ASMGW92C
225	9/92	21.4	JS	3.3	U	31	UBP	45	JI	11.5	U	99	E	ESE, 1/93
225	11/92	14.2		3.9	U	34	UBB	38		17	UBP	103	E	ESE, 4/93
225	02/10/93	15.3		2.2	U	45	U	15		6.3	U	0		ASMGW93B
225	05/12/93	15.5		0.04	U	13.5	U	9		6	UR			ASMGW93D
225	07/19/93	13		2.6	U	11.8	U	14.7		7.6	UJ			ASMGW93E
226D	07/23/92	5.1	J	3	U	15	U	260		3	U	31.2	()	ASMGW92C
226D	9/92	9.4	JS	3.3	U	22	UBP	243	JI	11.5	U	29	E	ESE, 1/93
226D	11/92	8.1		3.9	U	29	UBP	132		6	UBR		E	ESE, 4/93
226D	02/09/93	9.1		2.2	U	9.2	U	135		6.3	U	0		ASMGW93B
226D	05/12/93	8.7		0.04		13.5	U	155		6	UR			ASMGW93D
226D	07/16/93	13	U	2.6	U	12.3	U	169		12.2	U			ASMGW93E
226D	07/16/93	11.9	U	2.6	U	11.8	U	160		14.4	U			ASMGW93E
227	9/92	52.4		0.3	UB	59	UBP	3	UB	11.5	U	28	E	ESE, 1/93
227	11/92	47.3		3.9	U	39	UBP	3.1	U	12	UBR		E	ESE, 4/93
227	02/09/93	49.2		2.2	U	17	U	3.9	U	10	U	0		ASMGW93B
227	05/14/93	49.3		0.13	U	13.5	U	2.6	U	6	U			ASMGW93D
227	07/22/93	106	J	2.6	U	11.8	U	4.1	U	17.8	U			ASMGW93E
227	07/22/93	125	J	0.11		11.8	U	4.1	U	11.2	U			ASMGW93E
228	9/92	6.5	JS	6	UB	25	UBP	11	UB	11.5	U	86	E	ESE, 1/93
229	9/92	5.1	JS	4	UB	31	UBP	16	UB	17		147	E	ESE, 1/93
230	9/92	1.3	UJS	3.3	UJD	53.2	UB	405	JI	26.2		290	E	ESE, 1/93
230	11/92	4	UBR	3.9	U	47	UBB	125		15	UBP	296	E	ESE, 4/93

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
230	02/08/93	2.4		2.2	U	9.2	U	57		8		279	(D)	ASMGW93B
230	05/12/93	1.4		0.05		13.5	U	51		6	UR			ASMGW93D
230	07/13/93	1		2.6	U	15.2	U	38.7		6	U			ASMGW93E
231	9/92	2.8	JS	5	UB	33	UBP	35	JI	11.5	U	25	E	ESE, 1/93
231	11/92	1.3	U	3.9	U	54	UBP	13		5.7	U	18	E	ESE, 4/93
231	02/11/93	3.2	UJ	2.2	U	25	U	3.9	U	10	U	0		ASMGW93B
231	02/11/93	2.5	U	2.2	U	25	U	3.9	U	10	U	0		ASMGW93B
231	05/12/93	1.3	U	0.04	U	13.5	U	2.6	U	6	UR			ASMGW93D
231	07/16/93	5.4	U	2.6	U	17.2	U	7		19.1	U			ASMGW93E
232	9/92	195	JS	5	UB	49	UBP	47	JI	11.5	U	36	E	ESE, 1/93
232	11/92	160		3.9	U	60	UBR	24		5.7	UBP	41	E	ESE, 4/93
232	02/05/93	128		2.2	U	54	U	8	U	7		29	(D)	ASMGW93B
232	05/17/93	236		0.04	U	13.5	U	2.6	U	8				ASMGW93D
232	07/20/93	262		2.6	U	81.6		6.8		7.6	U			ASMGW93E
233	9/92	4.1	UB	0.5	UB	931		25		11.5	U	10	E	ESE, 1/93
233	11/92	3.8	UBB	3.9	U	42	UBP	6		10	UBR	20	E	ESE, 4/93
233	02/09/93	2.8	U	2.2	U	28	U	3.9	U	13	U	0		ASMGW93B
233	05/15/93	3.5		0.04	U	13.5	U	2.6	U	6	U			ASMGW93D
233	07/15/93	7.2	UJ	2.6	U	11.8	U	4.1	U	7.6	U			ASMGW93E
234D	9/92	2.7	UB	3.3	U	9	UBP	4	UB	11.5	U	33	E	ESE, 1/93
234D	11/92	4.3	UBR	3.9	U	30	UBB	3.1	U	9	UBP	24	E	ESE, 4/93
234D	02/05/93	1.7		2.2	U	40	U	5	U	6.3	U	29	(D)	ASMGW93B
234D	05/12/93	2.7		0.04	U	13.5	U	2.6	U	6	UR			ASMGW93D
234D	07/14/93	1.7	UJ	2.6	U	13.5	U	2.6	U	6	U			ASMGW93E
235	09/24/93	2.8		1.9	J	16	U	0		15800				ASMGW93F
235	09/24/93	2.4		1.9	J	13.7	U	0		15800				ASMGW93F
304	1/8/85	6U		.7U		31U		NA		27U		151		Stiller, 1985
309	1/4/85	12		5U		31U		NA		110		42		Stiller, 1985
311	1/4/85	5.3U		.5U		31U		NA		27U		362		Stiller, 1985
312	1/16/85	7		.7U		31U		NA		27U		215		Stiller, 1985
314	1/8/85	6.1U		.6U		31U		NA		140		304		Stiller, 1985
318	1/4/85	5.3U		.5U		31U		NA		160		258		Stiller, 1985
319	1/16/85	6.6U		.8U		160		NA		53		87		Stiller, 1985
321	1/17/85	3.5U		1U		59		NA		100		76		Stiller, 1985

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
328	1/4/85	5.3U		.5U		31U		NA		14U		.5U		Stiller, 1985
329	1/17/85	3.5U		.8U		84		NA		27U		45		Stiller, 1985
336	1/4/85	5.3U		.5U		830		NA		140		100		Stiller, 1985
405	1/7/85	5.3U		.5U		31U		NA		27U		482		Stiller, 1985
408	1/7/85	5.3U		.5U		31U		NA		27U		58		Stiller, 1985
411	1/7/85	5.3U		.5U		290		NA		90		180		Stiller, 1985
501	1/8/85	4.5U		.6U		31U		NA		280		62		Stiller, 1985
A1BR2	7/89	3820		2		10		5.4		4.7		522		PTI R/I F/S, 1991
A1BR2	9/91	5080		2U		11U		1U		2U		559		ESE 1/92
A1BR2	9/91	5150		2U		11U		1U		2U		560		ESE 1/92
A1BR2	9/91	5150		2U		11U		1U		2U		551		ESE 1/92
A1-BR2	02/20/92	5190		5.8		4	U	1	U	2.5				ASMGW92B
A1-BR2	06/03/92	5020		3	U	27	U	3	U	2	U	518	()	ASMGW92C
A1BR-2	9/92	4450		0.3	UB	25	UBP	2	UB	11.5	U	491	E	ESE, 1/93
A1BR-2	11/92	4780		3.9	U	37	UBR	3.1	U	5.7	UBP	515	E	ESE, 4/93
A1-BR2	02/02/93	5080		2.2	U	9.2	U	3.9	U	6.3	U	466	(D)	ASMGW93B
A1-BR2	05/19/93	8470		0.15		14	U	2.6	U	9	U			ASMGW93D
A1-BR2	07/23/93	7140		2.6	U	12.5	U	4.1	U	7.6	U			ASMGW93E
A1BR3	7/89	25.4		2		10		108		11		111		PTI R/I F/S, 1991
A1-BR3	06/03/92	24.5		3	U	27	U	4.1		2	U	99.4	()	ASMGW92C
A1BR-3	9/92	18.1		0.3	UB	45	UBP	4	UB	11.5	U	91	E	ESE, 1/93
A1BR-3	11/92	14.3		3.9	U	27	UBR	3.1	U	5.7	UBP	96	E	ESE, 4/93
A1-BR3	02/02/93	15.6	UJ	2.2	U	9.2	U	3.9	U	6.3	U	80	(D)	ASMGW93B
A1-BR3	02/02/93	15.9	U	2.2	U	9.2	U	4	U	6.3	U			ASMGW93B
A1-BR3	05/19/93	15.6	U	0.11	U	13.5	U	7	U	6	U			ASMGW93D
A1-BR3	07/22/93	33.4	J	2.6	U	11.8	U	4.1	U	7.6	U			ASMGW93E
A2BR	7/89	900		2		10		2.6		2		297		PTI R/I F/S, 1991
A2BR	9/91	854		2U		12U		1U		2U		241		ESE 1/92
A2-BR	02/18/92	979	J	3	U	5.7		1	U	2	U			ASMGW92B
A2-BR	06/01/92	1150		3	U	27	U	3	U	4.1	U	231	()	ASMGW92C
A2BR	9/92	843		0.4	UB	46	UBP	2	UB	11.5	U	182	E	ESE, 1/93
A2BR	11/92	1030		3.9	U	22	UBR	3.1	U	5.7	UBP	173	E	ESE, 4/93
A2-BR	02/04/93	1200		2.2	U	9.2	U	3.9	U	7		198	(D)	ASMGW93B
A2-BR	05/18/93	2410		0.11	U	13.5	U	2.6	U	6	U			ASMGW93D
A2-BR	07/20/93	1340		0.16	U	11.8	U	4.1	U	7.6	U			ASMGW93E
AN-001	12/17/85	5U		2U		NA		49		63		18		Tetra Tech #4, 1986

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
AN-002	12/17/85	5U		2U		NA		43		277		34		Tetra Tech #4, 1986
AN-003	12/17/85	5U		2		NA		50		118		19		Tetra Tech #4, 1986
AN-004	12/17/85	5U		2U		NA		50		176		18		Tetra Tech #4, 1986
AN-005	12/17/85	5U		2U		NA		46		20		18		Tetra Tech #4, 1986
B4BR	7/89	4.2		3.6		291		8.4		60		418		PTI R/I F/S, 1991
B4BR	9/91	1120		49.3		12U		25		606		489		ESE 1/92
B4-BR	02/18/92	1410	J	45.6		10.9	U	22.5		545				ASMGW92B
B4-BR	02/18/92	1330	J	44.7		15.6	U	22.2		515				ASMGW92B
B4-BR	06/01/92	1640		39.8		27	U	20.6		598		0		ASMGW92C
B4-BR	06/01/92	1660		39.1		27	U	22.4		611		532	()	ASMGW92C
B4BR	9/92	1210		45	UB	53	UBP	22		522		438	E	ESE, 1/93
B4BR	11/92	1220		38		30	UBR	24		525		476	E	ESE, 4/93
B4-BR	02/03/93	1320		42		14		28		412		451	(D)	ASMGW93B
B4-BR	05/18/93	1190		56.3		16	U	26		753				ASMGW93D
B4-BR	07/16/93	1130		49.1		11.8	U	30.8		652				ASMGW93E
C-1	11/25/91	2.9		2.8	U	34.1		148		29.3		205	()	SBCGW91C
C-1	10/27/92	4.1	A	0.1	U	47	U	4	U	30	U			SBCGW92B
C-2	07/31/91	1.5		1.5		0		0		179	UJ			SBCGW91A
C-2	10/27/92	2.4	A	1.7		143	U	80		258				SBCGW92B
C-3	11/23/91	1.6	U	10.4		0		0		2110		126	()	SBCGW91C
C-3	10/27/92	1.9	A	9.2		132	U	711		1240				SBCGW92B
C-4	11/25/91	6.1		25.7		0		0		9250		161	()	SBCGW91C
C-4	10/27/92	8.3	A	29.2		6040		4740		8190				SBCGW92B
C-4S	07/30/91	11.2		0.4		0		0		6200	UJ			SBCGW91A
C-4S	10/27/92	16.4	A	0.45		8320		5290		7390				SBCGW92B
C-5	08/01/91	2.4		1.3		0		0		52.7	UJ			SBCGW91A
C-5	10/27/92	3.6	A	0.16		528		4830		68	U			SBCGW92B
C-6	11/25/91	8.7		2.8	U	0		0		308		137	()	SBCGW91C
C-6	10/27/92	12	A	0.1	U	4220		1310		123				SBCGW92B
C-24	10/27/92	4.9	A	4.7		97	U	4880		271				SBCGW92B
C-25	10/27/92	3	A	2.7		62	U	1850		247				SBCGW92B
C-26	10/27/92	6	A	0.61		205	U	1040		42	U			SBCGW92B

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
C-27	10/27/92	8.1	A	0.39		90	U	1000		105				SBCGW92B
C-28	10/27/92	12.4	JA	0.48		1820		2040		85				SBCGW92B
C2AL	7/89	1810		2		12500		6880		7100		840		PTI R/I F/S, 1991
C2AL	9/91	2440		6.2		13400		7850		8650		781		ESE 1/92
C2-AL	02/19/92	2440		6		13300		7980		8470				ASMGW92B
C2-AL	06/02/92	2370		3	U	11100		7210		8830		826	()	ASMGW92C
C2AL	9/92	2010		0.7	UB	11800		6960		7740		786	E	ESE, 1/93
C2AL	11/92	2120		3.9	U	10900		6870		8330		774	E	ESE, 4/93
C2-AL	02/03/93	2380		2.2	U	13700		8710		9690		755	(D)	ASMGW93B
C2-AL	05/18/93	2450		0.5		12900		8120		8390				ASMGW93D
C2-AL	07/22/93	2240		0.31	J	12100		7390		8070				ASMGW93E
C2BR	7/89	845		2		7650		3940		3330		924		PTI R/I F/S, 1991
C2-BR	06/02/92	1240		3	U	6430		3340		3500		1037	()	ASMGW92C
C2BR	11/92	979		3.9	U	6210		2970		2920		1020	E	ESE, 4/93
C2-BR	02/03/93	1240		2.2	U	8660		4280		4040		1010	(D)	ASMGW93B
C2-BR	05/18/93	1200		0.11	U	8220		3950		3510				ASMGW93D
C2-BR	07/22/93	1150		2.6	U	7580		3720		3480				ASMGW93E
CFR-3	9/92	2	UB	3.3	U	792		3740		11.5	U	195	E	ESE, 1/93
CFR-3	11/92	3.3	UBB	3.9	U	790		3400		10	UBR	192	E	ESE, 4/93
CFR-3	02/05/93	1.3	U	2.2	U	1020		3280		6.3	U	201	(D)	ASMGW93B
CFR-3	05/17/93	1.3	U	0.11	U	884		2590		6	U			ASMGW93D
CFR-3	07/19/93	1.6	U	2.6	U	819		2010		7.6	UJ			ASMGW93E
D2BR	7/89	20.1		2		188		1080		10.3		806		PTI R/I F/S, 1991
D3AL	9/91	38.4		2U		6U		1U		2U		1210		ESE 1/92
D3AL1	7/89	81.2		3.45		54		25.3		25.3		1210		PTI R/I F/S, 1991
D3-AL1	09/17/91	38.4		2	U	21	U	1	U	2	U			ASMGW91C
D3-AL1	02/19/92	66.5		4.1		7.7	U	1	U	5.1	UJ			ASMGW92B
D3-AL1	06/01/92	66.5		5.1		27	U	3	U	2	U	1290	()	ASMGW92C
D3AL-1	9/92	68		0.5	UB	39	UBP	7	UB	14		1230	E	ESE, 1/93
D3AL-1	11/92	45.1		3.9	U	40	UBR	4		19	UBR	1130	E	ESE, 4/93
D3-AL1	02/03/93	53.2		2.2	U	26		7		16		1110	(D)	ASMGW93B
D3-AL1	05/20/93	60.9		0.1	U	19	U	11	U	21	U			ASMGW93D
D3-AL1	07/22/93	101	J	2.6	U	97.5	U	8.8		21.8	U			ASMGW93E
D3AL3	7/89	186		2		10		2		2		768		PTI R/I F/S, 1991
DW-1	07/28/93	1.2	U	0.04	U	0		0		11				ASMGW93J
DW-2	07/28/93	1.9		0.04	U	0		0		7.6	U			ASMGW93J

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
DW-3	07/28/93	1		0.04	U	0		0		27				ASMGW93J
DW-4	07/28/93	1	U	0.04	U	0		0		7.6	U			ASMGW93J
DW-5	07/28/93	7.9		0.04	U	0		0		8				ASMGW93J
DW-301	01/04/85	10		0	U	30	U	0		40000		20	(D)	SBCGW85A
DW-304	01/08/85	10	U	0	U	30	U	0		30	U	151	(D)	SBCGW85A
DW-309	01/04/85	10		10	U	30	U	0		110		42	(D)	SBCGW85A
DW-311A	01/04/85	10	U	0	U	30	U	0		30	U	362	(D)	SBCGW85A
DW-312	01/08/85	10		0	U	30	U	0		30	U	215	(D)	SBCGW85A
DW-314	01/08/85	10	U	0	U	30	U	0		140		304	(D)	SBCGW85A
DW-318	01/04/85	10	U	0	U	30	U	0		160		258	(D)	SBCGW85A
DW-319	01/16/85	10	U	0	U	160		0		50		87	(D)	SBCGW85A
DW-321	01/17/85	0	U	0	U	60		0		100		76	(D)	SBCGW85A
DW-328	01/04/85	10	U	0	U	30	U	0		30	U	1	U(D)	SBCGW85A
DW-329	01/17/85	0	U	0	U	80		0		30	U	45	(D)	SBCGW85A
DW-336	01/04/85	10	U	0	U	830		0		140		100	(D)	SBCGW85A
E2AL	9/91	5.3		2U		11U		12.4		2U		275		ESE 1/92
E2AL	9/91	NA		NA		NA		NA		NA		275		ESE 1/92
E2AL	11/92	1.3	U	3.9	U	35	UBP	4		10	UBR	185	E	ESE, 4/93
E2AL1	7/89	4 2		2		161		419		21.6		NA		PTI R/I F/S, 1991
E2-AL1	09/18/91	5.3		2	U	11	U	12.4		2	U			ASMGW91C
E2-AL1	02/21/92	1	U	1	U	6	U	2	U	2.5				ASMGW92B
E2-AL1	06/02/92	1		3	U	27	U	6.1		2	U	203	()	ASMGW92C
E2AL1	9/92	3.1	UB	0.5	UB	51	UBP	23		11.5	U	196	E	ESE, 1/93
E2-AL1	02/09/93	3.8	UJ	2.2	U	28	U	3.9	U	15	U			ASMGW93B
E2-AL1	05/19/93	0.98	U	0 04	U	33	U	31		25	U			ASMGW93D
E2-AL1	07/16/93	8	UJ	2.6	U	22.1	U	4.1	U	16.3	U			ASMGW93E
E2AL2	7/89	5.4		2		10		41.9		10.5		40.3		PTI R/I F/S, 1991
F2BR	7/89	1		2		10		2.3		4.3				PTI R/I F/S, 1991
F2BR	9/91	14.6		2U		11U		1.9		2U		85.6		ESE 1/92

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
F2-BR	02/19/92	1	U	3	U	4	U	1	U	2	U			ASMGW92B
F2-BR	06/02/92	1.4	J	3	U	27	U	3	U	2	U	79.8	()	ASMGW92C
F2BR	9/92	2.9	UB	0.3	UB	30	UBP	2	U	11.5	U	96	E	ESE, 1/93
F2BR	11/92	1.3	U	3.9	U	42	UBP	3.1	U	12	UBR	80	E	ESE, 4/93
F2-BR	02/11/93	3.7	U	2.2	U	17	U	3.9	U	13	U			ASMGW93B
F2-BR	05/15/93	1.3	UR	0.04	U	13.5	U	2.6	U	6	U			ASMGW93D
F2-BR	07/16/93	5.4	U	2.6	U	17.2	U	4.1	U	18.2	U			ASMGW93E
FH-1	12/90	2.9JL		4.3U		564		6.4 Q		13.8 Q		25.5		ESE 6/91
FH-1	12/90	3.3JL		4.3U		47.8 Q		2.9 Q		12.4 Q		24.3		ESE 6/91
FH-1	12/90	4.2JL		4.3U		71.1 Q		1.8U		11.7 Q		25.6		ESE 6/91
FH-1	3/91	2UWG		3U		25U		2U		10U		23.9		ESE 6/91
FH-1	6/91	5.8		2U		12U		1.5		2U		20		ESE 9/91
FH-1	9/91	2U		2U		12.6		1U		6.9		22.7		ESE 1/92
FH-2	12/91	10.2		2U		11U		7.1		2U		37.3		ESE 3/92
FH-2	02/13/92	16.2		1	U	6	UJ	25.3		2.9				ASMGW92B
FH-2	05/27/92	7.9	J	3	U	27	U	3	U	2	U	8.4	()	ASMGW92C
FH-2	9/92	16.5		4	U	111	UBP	43		1.5	U			
FH-2	11/92	15		3.9	U	46	UBP	46		5.7	U	106	E	ESE, 4/93
FH-2	02/07/93	13.3		0.1	U	10	U	44		7		97	(D)	ASMGW93B
FH-2	02/07/93	0		0.11	U	0		0		0				ASMGW93B
FH-2	05/10/93	16.5		0.04	U	26	U	41		7				ASMGW93D
FH-2	07/12/93	17.4		2.6	U	11.8	U	39.7		9.7				ASMGW93E
GW-01	12/29/87	2.8	B	5	U	15	UJ	3	UJ	13	UJ	30	(D)	SBCGW87A
GW-01	05/19/88	2.6	B	5	U	56	U	7	U	20	J	26	(D)	SBCGW87A
GW-02D	05/23/88	2	U	7.3		409		4460		18.1	BJ	554	(D)	SBCGW87A
GW-02S	05/23/88	197		10.7		76500		26400		51.7		1620	(D)	SBCGW87A
GW-02S	01/14/88	57		6		72400		26800		195		1100	(D)	SBCGW87A
GW-02S	01/14/88	72		5		80900		31600		226		870	(D)	SBCGW87A
GW-03D	05/23/88	2	U	7.2		56	U	97.7		16.1	BJ	1150	(D)	SBCGW87A
GW-03D	01/15/88	3	U	8		35	B	58		43		1010	(D)	SBCGW87A
GW-03D	01/15/88	3	U	5	U	18	B	52		60		1200	(D)	SBCGW87A
GW-03S	05/23/88	2	U	8.3		163		335		16.3	BJ	1280	(D)	SBCGW87A
GW-03S	01/18/88	2	U	5	U	146	J	309		18	B	1020	(D)	SBCGW87A
GW-04	05/24/88	2	U	5	U	56	U	7	U	27.2		398	(D)	SBCGW87A
GW-04	01/19/88	2	U	5	U	15	U	3	BJ	16	B	300	(D)	SBCGW87A
GW-05	05/24/88	2	U	12.7		1020		6990		149		1180	(D)	SBCGW87A
GW-05	01/19/88	4.5	B	5	U	965	J	6890		100		950	(D)	SBCGW87A
GW-06D	12/28/87	2.6	B	7		17	B	9	B	13	UJ	68	(D)	SBCGW87A
GW-06D	05/19/88	3	B	5	U	56	U	7	U	4.7	BJ	22.6	(D)	SBCGW87A

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
GW-06S	12/28/87	4.7	B	5	U	15	U	8	B	13	UJ	47	(D)	SBCGW87A
GW-06S	12/28/87	5.9	B	5		15	U	6	B	13	UJ	44	(D)	SBCGW87A
GW-06S	05/19/88	4.9	B	5	U	56	U	7	U	240		63.3	(D)	SBCGW87A
GW-07D	05/19/88	2	U	5.2		56	U	7	U	9.3	BJ	200	(D)	SBCGW87A
GW-07D	01/15/88	3	U	5	U	19	B	26		38		210	(D)	SBCGW87A
GW-07S	05/19/88	28.2		5	U	56	U	116		32.3		139	(D)	SBCGW87A
GW-07S	05/19/88	28.1		5	U	56	U	114		22.5	J	142	(D)	SBCGW87A
GW-07S	01/15/88	41		5		577		592		60		60	J(D)	SBCGW87A
GW-08D	12/29/87	2	U	5		68	BJ	15	J	36	J	92	(D)	SBCGW87A
GW-08D	12/29/87	2	U	7		26	BJ	15	J	41	J	94	(D)	SBCGW87A
GW-08D	05/19/88	2	U	5	U	56	U	7	U	6.2	BJ	101	(D)	SBCGW87A
GW-08S	12/29/87	2	U	5	U	68	BJ	175		22	J	420	(D)	SBCGW87A
GW-08S	05/19/88	2	U	5	U	56	U	45		12.7	BJ	461	(D)	SBCGW87A
GW-09	12/28/87	6.8	B	5		15	U	22		13	UJ	63	(D)	SBCGW87A
GW-09	05/19/88	6.7	B	5	U	56	U	7.1	B	21.2	J	71.2	(D)	SBCGW87A
GW-10D	05/20/88	2	U	5.9		56	U	2150		41.7	J	1050	(D)	SBCGW87A
GW-10D	01/13/88	3	U	5		46	B	1340		106		1010	(D)	SBCGW87A
GW-10D	01/13/88	3	U	5	U	15	U	1870		116		1100	(D)	SBCGW87A
GW-10S	05/20/88	16.8		5	U	2530		10800		330		470	(D)	SBCGW87A
GW-10S	01/14/88	14		5	U	100		9990		250		710	(D)	SBCGW87A
GW-11D	05/20/88	4.1	B	5	U	2630		15700		104		687	(D)	SBCGW87A
GW-11D	05/20/88	2.8	B	5	U	1630		15900		64.8		660	(D)	SBCGW87A
GW-11D	01/14/88	3	U	5		395		18200		281		720	(D)	SBCGW87A
GW-11S	05/20/88	105		5	U	52500		13200		1090		1006	(D)	SBCGW87A
GW-11S	01/14/88	33		6		29400		18100		747		790	(D)	SBCGW87A
GW-12D	05/24/88	2	U	5	U	56	U	35.2		12.2	BJ	106	(D)	SBCGW87A
GW-12D	05/24/88	2	U	5	U	56	U	22.4		8	B	101	(D)	SBCGW87A
GW-12D	01/18/88	2	U	5	U	15	U	20		18	B	55	(D)	SBCGW87A
GW-12S	05/24/88	2	U	6.8		56	U	8180		253		689	(D)	SBCGW87A
GW-12S	01/18/88	2.4	B	9		49	BJ	7620		233		250	(D)	SBCGW87A
GW-13D	05/23/88	2	U	5	U	56	U	13.2	B	10.6	BJ	723	(D)	SBCGW87A
GW-13D	01/18/88	2	U	5	U	15	U	18		24		760	(D)	SBCGW87A
GW-13S	05/23/88	61.2		11.5		31600		16200		29.9	J	1490	(D)	SBCGW87A
GW-13S	01/18/88	41		5	U	23300		16600		29		1300	(D)	SBCGW87A
GW-14D	05/23/88	2	U	5	U	56	U	1210		10.1	BJ	554	(D)	SBCGW87A
GW-14D	05/23/88	2	U	6.5		56	U	1240		17.1	B	565	(D)	SBCGW87A
GW-14D	01/18/88	2	U	5		36	B	1400		29		350	(D)	SBCGW87A
GW-14D	01/18/88	2	U	5	U	40	B	1450		26		470	(D)	SBCGW87A
GW-14S	05/23/88	3.6	B	5	U	56	U	352		35.5		325	(D)	SBCGW87A

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
GW-14S	01/18/88	7.1	B	5	U	45	BJ	387		40		310	(D)	SBCGW87A
GW-15D	05/20/88	2	U	5	U	56	U	10.2	B	37.1	J	606	J(D)	SBCGW87A
GW-15D	01/20/88	2	U	5	U	17	B	22		26		790	(D)	SBCGW87A
GW-15D	01/20/88	2	U	5	U	15	U	37	J	28	J	720	(D)	SBCGW87A
GW-15S	05/20/88	6.5	B	5	U	259		1490		36.1	J	128	J(D)	SBCGW87A
GW-15S	01/20/88	6.7	B	5	U	25	BJ	738		27	J	100	(D)	SBCGW87A
GW-16D	05/20/88	2	U	5	U	70.1	B	8550		6.3	BJ	1060	J(D)	SBCGW87A
GW-16D	01/19/88	2	U	5	U	19	BJ	8320		17	B	960	(D)	SBCGW87A
GW-16D	01/19/88	2	U	5	U	36	BJ	7900		40		1020	(D)	SBCGW87A
GW-16S	05/20/88	2	U	5	U	573		10100		33.5	J	1130	J(D)	SBCGW87A
GW-16S	01/19/88	2	U	5	U	128	J	5800		13	U	1100	(D)	SBCGW87A
GW-17	05/24/88	2	U	11.7		2360		14000		1180		1110	J(D)	SBCGW87A
GW-17	01/25/88	6.5	B	5	U	4560	J	16300		1380		1100	(D)	SBCGW87A
GW-17	01/25/88	4.9	B	5	U	4000	J	14500		1250		980	(D)	SBCGW87A
GW-18D	05/24/88	2	U	5.8		174		3320		69.2		335	(D)	SBCGW87A
GW-18D	01/20/88	2	U	5	U	27	BJ	3630		29	J	250	(D)	SBCGW87A
GW-18S	05/24/88	2.9	B	10.9		56	U	29.5		18.8	BJ	420	J(D)	SBCGW87A
GW-18S	01/20/88	4	B	5	U	40	BJ	91		30	J	510	(D)	SBCGW87A
GW-19D	05/24/88	2	U	8.4		56	U	82.2		6.2	BJ	484	J(D)	SBCGW87A
GW-19D	01/26/88	2	U	5	U	15	U	97		27		460	(D)	SBCGW87A
GW-19S	05/24/88	2	U	7.1		8650		10700		16.6	BJ	1030	J(D)	SBCGW87A
GW-19S	01/26/88	2	U	5		3630	J	11600		48		980	(D)	SBCGW87A
LF-4	12/90	6.5JL		4.3		36.1 Q		5.3 Q		385		40.6		ESE 6/91
LF-4	3/91	4.7WQ		3U		25U		2U		413		35.5		ESE 6/91
LF-4	6/91	19.9M		2U		12U		1.5		112		64.2		ESE 9/91
LF-4	9/91	9.4		2U		65.8		2.8		119E		50.4		ESE 1/92
LF-4	12/91	5.8		3.4		11U		1U		240		37.7		ESE 3/92
LF-4	11/16/90	0.21	U	1.1	U	53.7		3.4	B	378.6				ASMGW90A
LF-4	12/17/90	1.8	UJ	4.3	U	36.1	U	5.3	B	385				ASMGW90B
LF-4	03/29/91	2	U	3	U	25	U	2	U	413				ASMGW91A
LF-4	02/17/92	3.7	J	3	U	9.7	U	1.5		248				ASMGW92B
LF-4	05/29/92	4.6	J	3	U	27	U	3	U	347		29.5	()	ASMGW92C
LF4	9/92	6.1		6	UB	45	UBP	11		294		31	E	ESE, 1/93
LF-4	11/92	7	UBB	3.9	U	27	UBP	3.1	U	346		30	E	ESE, 4/93
LF-4	02/04/93	7.9		2.8		23		3.9	U	509		115	(D)	ASMGW93B
LF-4	02/04/93	0		2.8		0		0		0				ASMGW93B
LF-4	05/17/93	5.3		2		13.5	U	2.6	U	386				ASMGW93D
LF-4	07/19/93	9.2		2.6	U	11.8	U	4.1	U	264				ASMGW93E
MBMG 44	4/4/80	NA		NA		NA		NA		NA		666		MBMG

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WELL NUMBER	DATE	As (ug/L)	Cd (ug/L)	Fe (ug/L)	Mn (ug/L)	Zn (ug/L)	SO4 (mg/L)	REFERENCE
MBMG 63	4/16/80	NA	NA	NA	NA	NA	685	MBMG
MBMG 1195	10/24/85	1.1	2U	4	NA	130	39.4	MBMG
MBMG 2670SP	10/8/80	NA	2U	2U	NA	4U	74.3	MBMG
MBMG2673	10/9/80	NA	2U	9	NA	34	18.3	MBMG
MBMG 2678	10/9/80	NA	2U	10	NA	190	113	MBMG
MBMG 2679	10/9/80	NA	2U	10	NA	6	15	MBMG
MBMG 2681	10/9/80	14.9	NA	11	NA	22	87.7	MBMG
MBMG 2682	10/8/80	0.3	1B	1	NA	16	19.8	MBMG
MBMG 2702	10/10/80	NA	4	2U	NA	4U	590	MBMG
MC1	12/5/85	10U	1	NA	NA	150	NA	Tetra Tech #4, 1986
MC2	12/5/85	5U	5U	516	56	402	273	Tetra Tech #4, 1986
MC3	12/5/85	10U	1	NA	NA	50	NA	Tetra Tech #4, 1986
MC4	12/5/85	10U	1	NA	NA	110	NA	Tetra Tech #4, 1986
MC5	12/5/85	11	2	NA	NA	1600	NA	Tetra Tech #4, 1986
MC6	12/5/85	5U	2U	NA	NA	130	NA	Tetra Tech #4, 1986
MC7	12/5/85	10U	1	NA	NA	1850	NA	Tetra Tech #4, 1986
MC8	12/5/85	10U	1U	NA	NA	180	NA	Tetra Tech #4, 1986
MC9	12/5/85	10U	1U	NA	NA	40	NA	Tetra Tech #4, 1986
MC10	12/5/85	5U	2U	NA	NA	20	NA	Tetra Tech #4, 1986
MC11	12/5/85	10U	1U	NA	NA	130	NA	Tetra Tech #4, 1986
MC12	12/5/85	10	1U	NA	NA	20	NA	Tetra Tech #4, 1986
MC13	12/5/85	20	1	NA	NA	200	NA	Tetra Tech #4, 1986
MC14	12/5/85	5U	6	NA	NA	20	NA	Tetra Tech #4, 1986
MC15	12/5/85	30	1	NA	NA	70	NA	Tetra Tech #4, 1986

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
MC16	12/5/85	13		1U		NA		NA		20		NA		Tetra Tech #4, 1986
MC17	12/5/85	20		1U		NA		NA		30		NA		Tetra Tech #4, 1986
MC18	12/5/85	5		6		NA		NA		2700		NA		Tetra Tech #4, 1986
MC19	12/5/85	10U		2		NA		NA		4400		NA		Tetra Tech #4, 1986
MC20	12/17/85	5U		2U		13		43		40		23		Tetra Tech #4, 1986
MC21	12/17/85	5U		2U		14		52		76		16		Tetra Tech #4, 1986
MC22	12/17/85	5U		2U		18		52		24		27		Tetra Tech #4, 1986
MC23	12/17/85	5U		2U		88		42		21		30		Tetra Tech #4, 1986
MW-1	7/23/87	6B		5U		20U		210		40		56		HILL 2/91
MW-1A	7/23/87	8B		5U		20U		320		40		181		HILL 2/91
MW-2	7/23/87	6B		5		820		170		20		185		HILL 2/91
MW-3	7/23/87	12		6		250		1080		110		62		HILL 2/91
NGP-1	09/24/93	167		0.06	UJ	39.2	U	0		23.6				ASMGW93F
OD-1S	07/27/93	20.9		0.16	U	20.8	U	4.1	U	7.6	U			ASMGW93F
OD-2S	07/27/93	6.6	J	0.24		11300		623		64				ASMGW93F
OD-2S	07/27/93	5.8	J	0.28		11200		620		64.1				ASMGW93F
OD-3S	07/27/93	1.7	U	0.26		23.4	U	4.1	U	7.6	U			ASMGW93F
OP-004	12/17/85	5U		2U		22		62		15		3.7		Tetra Tech #4, 1986
OP-005	12/17/85	5U		2U		27		68		295		3.7		Tetra Tech #4, 1986
OP-006	12/17/85	5U		2U		61		63		26		32		Tetra Tech #4, 1986
SA-1	08/10/93	84.6		0.37	U	161	U	322		8				ASMGW93G
SA-1	08/10/93	24		0.1	U	9.68		28.5		663	R			ASMGW93G
SA-2	08/10/93	13		0.17		64.1		104		8030	R			ASMGW93G
SA-3	08/11/93	7		3.71		3.9	U	342		3730	R			ASMGW93G
SA-4	08/10/93	7.4		0.39		3.9	U	259		9350	R			ASMGW93G
SA-5	08/30/93	245		0.3	U	72.2	U	66.6		7.6	U			ASMGW93G
SA-5	08/30/93	206		0.31	U	77.8	U	80.4		285				ASMGW93G
SA-6	08/30/93	80.1		0.23	U	97.2	U	107		7.6	U			ASMGW93G

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
SBL-2	08/25/93	2.5		14		260		46.5		9120	J			ASMGW93G
SBL-5	08/26/93	1.9		51.9		3520		3380		46400				ASMGW93G
SP1	3/91	19		3U		25U		2U		10U		250		
SP1	6/91	10.6WG		2U		12U		1U		2U		269		
SRP-1	09/24/93	21.8		0.27	UJ	13.7	U	0		8.7	U			ASMGW93F
T-1A	12/90	1.8UJL		4.3U		31.4 Q		6 Q		218		24		ESE 6/91
T-1A	3/91	2U		3U		25U		2U		235		26.2		ESE 6/91
T-1A	6/91	2UWG		3.3		31.6		14.2		376		100		ESE 9/91
T-1A	9/91	2UWG		2.3		11U		1.4		203		23.9		ESE 1/92
T-1A	12/91	2U		1U		11U		1U		181		22.7		ESE 3/92
T1A	11/12/90	1.25	U	0.4	U	2.8	U	87		220.5				ASMGW90A
T1A	02/14/92	1	U	1.4		6	UJ	2	U	180				ASMGW92B
T1A	05/27/92	1	UJ	3	U	27	U	3	U	209		28.6	()	ASMGW92C
T1A	9/92	1.7		6	UB	32	UBP	2	U	171		23	E	ESE, 1/93
T-1A	11/92	1.3	U	3.9	U	39	UBP	3.1	U	186		20	E	ESE, 4/93
T1A	02/07/93	1.3	U	1.6		9.2	U	3.9	U	181		0		ASMGW93B
T1A	02/07/93	0		1.6		0		0		0		0		ASMGW93B
T1A	05/10/93	1.3	U	2		13.5	U	2.6	U	198				ASMGW93D
T1A	07/12/93	3.4	U	2	U	13.3	U	8		300				ASMGW93E
T-1B	12/90	1.8UJL		4.3U		61.7 Q		6.2 Q		246		24.6		ESE 6/91
T1B	11/12/90	1.25	U	1.8	U	15.3	B	15.3		251.4				ASMGW90A
T-1C	12/90	1.8UJL		4.3U		73.8 Q		13.5 Q		269		25.5		ESE 6/91
T1C	11/11/90	1.25	U	1.1	U	13.3	B	18.9		271				ASMGW90A
T-1D	12/90	1.8UJL		4.3U		151 Q		35.6 Q		9.7 U		66.2		ESE 6/91
T-1D	3/91	2U		3U		45.7		139		5U		57.7		ESE 6/91
T-1D	6/91	2UWG		2U		36.3		88.8		1U		66.8		ESE 9/91
T-1D	9/91	2U		2U		11U		69.4		2U		60.9		ESE 1/92
T-1D	12/91	2U		2.2		95.1		58.7		2U		60.7		ESE 3/92
T1D	11/11/90	1.25	U	1.5	U	22.5	B	31.4		47.9				ASMGW90A
T1D	02/13/92	1	U	1	U	39.1	UJ	53.4		2	U			ASMGW92B
T1D	05/27/92	1	UJ	3	U	58.6		29.6		2	U	62.8	()	ASMGW92C
T1D	9/92	4.1	UB	3.3	UJD	114	UB	41.3	JI	11.5	U	58	E	ESE, 1/93
T-1D	11/92	1.3	UJG	3.9	U	152	UPB	22		6	UBR	62	E	ESE, 4/93
T-1D (FR)	11/92	1.3	UJG	3.9	U	159	UBP	20		8	UBR	60	E	ESE, 4/93
T1D	02/07/93	1.3	U	0.1	U	66	U	15		6.3	U	0		ASMGW93B
T1D	02/07/93	0		0.1	U	0		0		0		0		ASMGW93B
T1D	05/10/93	1.3	U	0.04	U	64	U	11		6	U			ASMGW93D
T1D	07/12/93	2.3	U	2.6	U	87.5	U	10.6		7.6	U			ASMGW93E
T1D	07/12/93	2.9	U	2.6	U	106	U	11.5		7.6	U			ASMGW93E
T-1E	12/90	1.8UJL		4.3U		51.8 Q		2.8 Q		186		25.9		ESE 6/91

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
T1E	11/15/90	0.21	U	4.4	B	9.2	B	10.3		204.4				ASMGW90A
T1E	11/15/90	0.21	U	2.7	U	8.9	B	8.3	B	202.5				ASMGW90A
T1E	11/15/90	1.25	U	0.1	U	9.8	B	5.9	B	200.8				ASMGW90A
T-2	12/90	3JL		4.3U		61.8 Q		1.8U		15.5 B		17.5		
T-2A	12/90	3JL		4.3U		40.7 Q		2.1 Q		167		31.5		ESE 6/91
T2A	12/12/90	1.8	UJ	4.3	U	40.7	B	2.1	B	167				ASMGW90B
T2A	11/09/90	1.25	U	0.8	U	26.5	B	10		149.4				ASMGW90A
T-2B	12/90	1.8UJL		4.3U		59.8 Q		7.9 Q		61.2		32.3		ESE 6/91
T-2B	3/91	2UG		3U		25U		1U		51.9		28.8		ESE 6/91
T-2B	6/91	2U		2U		12U		2		12.4		45.9		ESE 9/91
T-2B	9/91	2UWG		2U		11U		1.3		27.7		47.5		ESE 1/92
T-2B	12/91	2U		2U		11U		1U		10.3		34.7		ESE 3/92
T2B	11/08/90	1.25	U	1.2	U	16.2	B	12.4		71				ASMGW90A
T2B	02/13/92	1.2		1	U	6	UJ	2	U	34.4	UJ			ASMGW92B
T2B	05/28/92	1	UJ	3	U	27	U	3	U	45.9	U	29.2	()	ASMGW92C
T2B	05/28/92	1	UJ	3	U	27	U	3	U	47.7	U	29.7	()	ASMGW92C
T2B	9/92	1.8		6	UB	128	UBP	3		26		29	E	ESE, 1/93
T-2B	11/92	1.4		3.9	U	46	UBP	3.1	U	40	UBR	27	E	ESE, 4/93
T2B	02/07/93	0		0.45		0		0		0		0		ASMGW93B
T2B	02/07/93	2.3		0.5		9.2	U	3.9	U	43		27	(D)	ASMGW93B
T2B	05/11/93	2	U	0.46		38	U	2.6	U	35				ASMGW93D
T2B	07/12/93	4.8	U	2.6	U	11.8	U	4.1	U	50.4				ASMGW93E
T-2C	12/90	1.8UJL		4.3U		114 Q		1.9 Q		172		31.5		ESE 6/91
T-2C	12/90	2.6JL		4.3U		45 Q		1.8U		179		31.7		ESE 6/91
T-2C	12/90	3.2JL		4.3U		47.2 Q		1.8U		173		31.7		ESE 6/91
T-2D	12/90	1.9JL		4.3U		39.8 Q		3.9 Q		113JE		34.4		ESE 6/91
T-2D	3/91	2		3U		25U		2U		126		29.2		ESE 6/91
T-2D	6/91	2UWG		2U		12U		1U		28.9		35.6		ESE 9/91
T-2D	9/91	2UWG		2U		11U		2.3		68.6		47.3		ESE 1/92
T-2D	12/91	2U		2U		11U		1.7		36.1		38.5		ESE 3/92
T2D	11/09/90	1.25	U	1.9	U	5	U	3.6	B	99.8	E			ASMGW90A
T2D	02/13/92	1.3		1	U	6	UJ	2	U	54.3				ASMGW92B
T2D	05/28/92	1.5	J	3	U	27	U	3	U	80.4		29.4	()	ASMGW92C
T2D	9/92	2.3		5	UB	59	UBP	2	U	47		31	E	ESE, 1/93
T-2D	11/92	2.3		3.9	U	51	UBP	3.1	U	70		28	E	ESE, 4/93
T2D	02/07/93	2.5		0.6		10	U	3.9	U	70		0		ASMGW93B
T2D	02/07/93	0		0.57		0		0		0		0		ASMGW93B
T2D	05/11/93	2.4	U	0.56		14	U	3	U	65				ASMGW93D
T2D	07/12/93	4	U	2.6	U	11.8	U	4.1	U	84.5				ASMGW93E
T2E	11/07/90	1.25	U	1	U	4.1	U	9.7		38.9				ASMGW90A
T-2E	12/90	2.8JL		4.3U		224 Q		1.8U		37.8 Q		34.1		ESE 6/91

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WS-1	12/17/85	5U		2U		18		54		41		477		Tetra Tech #4, 1986
WS-2	12/17/85	5U		2U		438		79		70		189		Tetra Tech #4, 1986
WS-3	12/17/85	5U		2U		845		3700		15		110		Tetra Tech #4, 1986
WS-4	12/17/85	5U		2U		378		118		28		731		Tetra Tech #4, 1986
WS-5	12/17/85	5U		2U		18		65		388		807		Tetra Tech #4, 1986
WSP-1	12/29/87	2.8		5U		15UJ		3UJ		13UJ		30		Hill/CN, 1989
WSP-1D	9/91	2UWG		2U		11UE		1U		2U		29.7		ESE 1/92
WSP-1D	02/21/92	3.5		1	U	6	U	2	U	2	U			ASMGW92B
WSP-1D	06/05/92	2.3	J	3	U	27	U	3	U	2	U	29.1	()	ASMGW92C
WSP-1D	9/92	7.5	UB	3.3	U	8.6	U	2	U	11.5	U	26	E	ESE, 1/93
WSP-1D	11/92	6.4	UBB	3.9	U	35	UBP	7		8	UBR	35	E	ESE, 4/93
WSP-1D	02/05/93	3.1		2.2	U	104	U	6	U	6.3	U	32	(D)	ASMGW93B
WSP-1D	05/12/93	5.4	UJ	0.04	U	19	U	2.6	U	6	U			ASMGW93D
WSP-1D	07/14/93	2.3		2.6	U	13.5	U	2.6	U	6	U			ASMGW93E
WSP-2D	06/13/92	1	UJ	4.7	J	0		0		2	UJ			ASMGW92D
WSP-2D	9/92	5.8								14			E	ESE, 1/93
WSP-2D	05/21/93	2.4		0.33		0		0		11				ASMGW93C
WSP-2S		197		10.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		165		1.4		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		244		1.4		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		72		5		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S	1/14/87	72S		5		80900		31600		226		870		Hill/CN, 1989
WSP-2S	01/16/92	656	U	1	U	0		0		88.8				ASMGW92A
WSP-2S	06/13/92	539		3	UJ	0		0		63.5	J			ASMGW92D
WSP-2S	9/92	606								82			E	ESE, 1/93
WSP-2S	01/05/93	617		15		0		0		118	UR	1170	(D)	ASMGW93A
WSP-2S	05/21/93	536		0.04	U	0		0		41				ASMGW93C
WSP-3D	1/15/88	3U		8		35		58		43		1010		Hill/CN, 1989
WSP-3D	01/16/92	3	J	1	U	0		0		5.8				ASMGW92A
WSP-3D	06/13/92	1	UJ	3	UJ	0		0		2	UJ			ASMGW92D
WSP-3D	9/92	3.6	UB							23	UB		E	ESE, 1/93
WSP-3D	01/04/93	1.3	U	3.9	U	0		0		24	UR	1000	(D)	ASMGW93A
WSP-3D	01/04/93	1.3	U	3.9	U	0		0		28	UR	1030	(D)	ASMGW93A
WSP-3D	05/24/93	3.3	U	0.04	U	0		0		6	U			ASMGW93C
WSP-3S		2U		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		2U		8.3		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		7.5		0.6		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		4.2		0.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S	1/15/88	2U		5U		156EJ		309		18		1020		Hill/CN, 1989

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WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WSP-3S	01/16/92	6.5	J	1.6		0		0		13.6				ASMGW92A
WSP-3S	06/13/92	1.2	J	9	J	0		0		9.7	J			ASMGW92D
WSP-3S	9/92	3.2	UB							39	UB		E	ESE, 1/93
WSP-3S	01/04/93	1.3	U	3.9	U	0		0		37	UR	1120	(D)	ASMGW93A
WSP-3S	05/24/93	8	U	0.04	U	0		0		1060				ASMGW93C
WSP-4	1/19/88	2U		5U		15U		3BJ		16		300		Hill/CN, 1989
WSP-4	9/91	2.2		2.1		11UE		2.3		17.7		587.2		ESE 1/92
WSP-4	01/15/92	1	U	3	U	0		0		3	U			ASMGW92A
WSP-4	06/14/92	1	UJ	3	U	0		0		2	U			ASMGW92D
WSP-4	06/14/92	1	UJ	3	U	0		0		2	U			ASMGW92D
WSP-4	9/92	3.2	UB							13	UB		E	ESE, 1/93
WSP-4	01/05/93	1.6		3.9	U	0		0		180	UR	693	(D)	ASMGW93A
WSP-4	05/20/93	1.2		0.04	UJ	0		0		18	U			ASMGW93C
WSP-5		4.9		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		2.7		0.8		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		2U		12.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		1.8		1.9		NA		NA		NA		NA		ESA, 9/4/91
WSP-5	1/19/88	4.5B		5U		965EJ		6890		100		950		Hill/CN, 1989
WSP-5	9/91	1U		2U		148E		7240		173		1094		ESE 1/92
WSP-5	01/15/92	1	U	3	U	0		0		160				ASMGW92A
WSP-5	06/14/92	1	UJ	7.8		0		0		195				ASMGW92D
WSP-5	9/92	4.2	UB							206	UB		E	ESE, 1/93
WSP-5	01/05/93	1.3	U	3.9	U	0		0		124	UR	1090	(D)	ASMGW93A
WSP-5	05/20/93	1.6		3.1		0		0		263				ASMGW93C
WSP-6D	12/28/87	2.6B		7		17		9		13UJ		68		Hill/CN, 1989
WSP-6S	12/28/87	4.7B		5U		15U		8		13UJ		47		Hill/CN, 1989
WSP-6S	9/91	2.1		2		11U		1U		2.2		53.4		ESE 1/92
WSP-6S	02/21/92	4		1	U	6	U	2	U	2.4				ASMGW92B
WSP-6S	06/05/92	2.9		3	U	27	U	3	U	2	U	57.8	()	ASMGW92C
WSP-6S	9/92	7.2	UB	3.3	U	313		6	UB	35		61	E	ESE, 1/93
WSP-6S	02/05/93	3.8		2.2	U	32	U	3.9	U	6.3	U	56	(D)	ASMGW93B
WSP-6S	05/18/93	4.3		0.16		13.5	U	2.6	U	9				ASMGW93D
WSP-6S	05/18/93	4.1		0.11	U	15	U	2.6	U	6	U			ASMGW93D
WSP-6S	07/19/93	5.8		2.6	U	11.8	U	4.1	U	7.6	UJ			ASMGW93E
WSP-7D	1/15/88	3U		5U		19		26		38		210		Hill/CN, 1989
WSP-7S	1/15/88	41S		5		577		592		60		60J		Hill/CN, 1989
WSP-8D	12/29/87	2U		5		68BJ		15J		36J		92		Hill/CN, 1989
WSP-8S	12/29/87	2U		5U		68BJ		175		22J		420		Hill/CN, 1989
WSP-9	12/28/87	6.8B		5		15U		22		6.5J		63		Hill/CN, 1989
WSP-9	9/91	5.7		2U		11UE		1U		2U		102.7		ESE 1/92
WSP-9	02/21/92	7		1	U	6	U	2	U	2	U			ASMGW92B

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WSP-9	06/05/92	3.8	J	3	U	27	U	3	U	2	U	84.7	()	ASMGW92C
WSP-9	9/92	9.3		3.3	U	8.6	U	2	U	11.5	U	101	E	ESE, 1/93
WSP-9	11/92	8.5	UBR	4		27	UBB	3.1	U	9	UBP	96	E	ESE, 4/93
WSP-9	02/05/93	6.2		2.2	U	59	U	3.9	U	6.3	U	0		ASMGW93B
WSP-9	02/05/93	8.8		0.1	U	9.2	U	3.9	U	6.3	U	0		ASMGW93B
WSP-9	02/05/93	0		0.11	U	0		0		0		0		ASMGW93B
WSP-9	05/12/93	8.4		0.04		13.5	U	2.6	U	6	UR			ASMGW93D
WSP-9	07/14/93	6		2.6	U	13.5	U	2.6	U	6	U			ASMGW93E
WSP-10D	1/13/88	3U		5U		15S		1870		116		1100		Hill/CN, 1989
WSP-10D	01/17/92	3.6	J	1	U	0		0		2.1				ASMGW92A
WSP-10D	06/14/92	1	UJ	4.4	J	0		0		2	UJ			ASMGW92D
WSP-10D	9/92	4.6								15	UB		E	ESE, 1/93
WSP-10D	01/04/93	2.5		3.9	U	0		0		11	UR	643	(D)	ASMGW93A
WSP-10D	05/21/93	1.5	U	0.75	U	0		0		10				ASMGW93C
WSP-10S		14		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-10S	1/14/88	14S		5U		100		9990		250		710		Hill/CN, 1989
WSP-10S	9/91	13.9		2U		NA		NA		266		NA		ESE 1/92
WSP-10S	01/17/92	18.3	J	1	U	0		0		270				ASMGW92A
WSP-10S	06/14/92	12.3	J	3	UJ	0		0		245	J			ASMGW92D
WSP-10S	9/92	15.5	UB							229	UB		E	ESE, 1/93
WSP-10S	01/04/93	14.2		3.9	U	0		0		227	UR	266	(D)	ASMGW93A
WSP-10S	05/21/93	12.8	U	0.04	U	0		0		398				ASMGW93C
WSP-11D	1/14/88	3U		5		395		18200		281		720		Hill/CN, 1989
WSP-11D	01/17/92	2	U	1	U	0		0		46.3				ASMGW92A
WSP-11D	06/13/92	1	UJ	5.6	J	0		0		28.5	J			ASMGW92D
WSP-11D	9/92	4.5								47	UB		E	ESE, 1/93
WSP-11D	01/04/93	1.3	U	3.9	U	0		0		53	UR	528	(D)	ASMGW93A
WSP-11D	05/24/93	2.4	U	0.35	U	0		0		41	U			ASMGW93C
WSP-11S		105		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-11S		3.3		6		NA		NA		NA		NA		ESA, 9/4/91
WSP-11S	1/14/88	33S		6		29400		18100		747		790		Hill/CN, 1989
WSP-11S	9/91	22.6S		1U		NA		NA		123		NA		ESE 1/92
WSP-11S	01/17/92	24.1	J	1	U	0		0		37.2				ASMGW92A
WSP-11S	06/13/92	195	J	3	UJ	0		0		598	J			ASMGW92D
WSP-11S	9/92	32.7	UB							94	UB		E	ESE, 1/93
WSP-11S	01/04/93	23.3		3.9	U	0		0		42	UR	592	(D)	ASMGW93A
WSP-11S	05/24/93	168		0.04	U	0		0		733				ASMGW93C
WSP-12D	1/18/88	2U		2.5		7.5		20		18		55		Hill/CN, 1989
WSP-12D	01/15/92	1	U	3	U	0		0		3	U			ASMGW92A
WSP-12D	06/13/92	1	UJ	3	UJ	0		0		2	UJ			ASMGW92D
WSP-12D	9/92	4.4								5.7	U		E	ESE, 1/93
WSP-12D	01/05/93	1.3	U	3.9	U	0		0		5.7	UR	144	(D)	ASMGW93A
WSP-12D	05/21/93	0.98	U	0.04	U	0		0		14	U			ASMGW93C
WSP-12S		2.4		9		NA		NA		NA		NA		ESA, 9/4/91

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WSP-12S		2U		6.8		NA		NA		NA		NA		ESA, 9/4/91
WSP-12S	1/18/88	2.4B		5		49E		7620		233		250		Hill/CN, 1989
WSP-12S	9/91	1.2		2.2		NA		NA		114		NA		ESE 1/92
WSP-12S	9/91	1.3WG		2.9		NA		NA		115		NA		ESE 1/92
WSP-12S	9/91	1U		2U		NA		NA		109		NA		ESE 1/92
WSP-12S	01/15/92	1.2		3	U	0		0		101				ASMGW92A
WSP-12S	06/13/92	1.6	J	5.6	J	0		0		113	J			ASMGW92D
WSP-12S	9/92	4.2								97			E	ESE, 1/93
WSP-12S	01/05/93	1.3	UJ	3.9	U	0		0		8	UR	573	(D)	ASMGW93A
WSP-12S	05/21/93	0.98	U	0.56		0		0		143				ASMGW93C
WSP-12S	05/21/93	0.98	U	0.57		0		0		148				ASMGW93C
WSP-13D	1/18/88	2U		2.5		7.5		18		24		760		Hill/CN, 1989
WSP-13D	01/16/92	2	U	1	U	0		0		2	U			ASMGW92A
WSP-13D	06/13/92	1	UJ	3	UJ	0		0		2.1	J			ASMGW92D
WSP-13D	9/92	5.1								13			E	ESE, 1/93
WSP-13D	01/05/93	3.8	J	3.9	U	0		0		27	UR	829	(D)	ASMGW93A
WSP-13D	05/21/93	1.9		0.12		0		0		7				ASMGW93C
WSP-13S		61		11.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-13S		41		2.5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-13S	1/18/88	41S		2.5		23300E		16600		29		1300		Hill/CN, 1989
WSP-13S	9/91	84.7S		1U		NA		NA		43.6		NA		ESE 1/92
WSP-13S	01/16/92	87.5	J	1	U	0		0		45.8				ASMGW92A
WSP-13S	06/13/92	81.4	J	4.5	J	0		0		32.9	J			ASMGW92D
WSP-13S	9/92	88.6								49			E	ESE, 1/93
WSP-13S	01/05/93	1.8		3.9	U	0		0		14	UR	1200	(D)	ASMGW93A
WSP-13S	05/21/93	87.9		0.04	U	0		0		59				ASMGW93C
WSP-14D	1/18/88	2U		5		36E		1400		29		350		Hill/CN, 1989
WSP-14D	01/15/92	1	U	3	U	0		0		3	U			ASMGW92A
WSP-14D	06/13/92	1.1	J	7.8	J	0		0		2	UJ			ASMGW92D
WSP-14D	9/92	4.8	UB							10	U		E	ESE, 1/93
WSP-14D	01/05/93	3.2		4		0		0		7	UR	340	(D)	ASMGW93A
WSP-14D	05/21/93	2.8		0.17		0		0		10				ASMGW93C
WSP-14S		3.6		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-14S		7.1		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-14S	1/18/88	7.1B		5U		45E		387		40		310		Hill/CN, 1989
WSP-14S	9/91	3.3		2U		NA		NA		32.2		NA		ESE 1/92
WSP-14S	01/15/92	1	U	3	U	0		0		31.7				ASMGW92A
WSP-14S	06/13/92	2.7	J	8.8	J	0		0		33.9	J			ASMGW92D
WSP-14S	06/13/92	2.3	J	4	J	0		0		32.3	J			ASMGW92D
WSP-14S	9/92	6.3	UB							45	UB		E	ESE, 1/93
WSP-14S	01/05/93	4.3		3.9	U	0		0		48	UR	347	(D)	ASMGW93A
WSP-14S	05/21/93	4.3		0.04	U	0		0		34				ASMGW93C
WSP-15D	1/20/88	2U		2.5NE		7.5		37J		28J		720		Hill/CN, 1989
WSP-15D	5/20/88	2U		5U		56U		53300		37.1J		606		Hill/CN, 1989

APPENDIX

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WSP-15S	1/20/88	6.7B		5NE		25E J		738		27J		100		Hill/CN, 1989
WSP-15S	5/20/88	6.5B		5U		259		12700		36.1J		128		Hill/CN, 1989
WSP-16D	1/19/88	2U		5U		19EJ		8320		17		960		Hill/CN, 1989
WSP-16D	5/20/88	2UW		5U		70.1		66400		6.3J		1060		Hill/CN, 1989
WSP-16D	01/15/92	1	U	3	U	0		0		3	U			ASMGW92A
WSP-16D	06/13/92	1	UJ	3	UJ	0		0		2	UJ			ASMGW92D
WSP-16D	9/92	1.3	UB							20	UB		E	ESE, 1/93
WSP-16D	01/04/93	1.3	U	3.9	U	0		0		21	UR	777	(D)	ASMGW93A
WSP-16S		2U		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-16S		2U		5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-16S	1/19/88	2U		5U		128EJ		5800		13U		1100		Hill/CN, 1989
WSP-16S	5/20/88	2UW		5U		573		70300		33.5J		1130J		Hill/CN, 1989
WSP-16S	9/91	1.2		2.4		NA		NA		35.3		NA		ESE 1/92
WSP-16S	01/15/92	1.2		3	U	0		0		23.4				ASMGW92A
WSP-16S	06/13/92	1	UJ	3	UJ	0		0		29.6	J			ASMGW92D
WSP-16S	9/92	3.1								42	UB		E	ESE, 1/93
WSP-16S	01/04/93	1.3	U	3.9	U	0		0		46	UR	679	(D)	ASMGW93A
WSP-17		2		11.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-17		4.9		2.5U		NA		NA		NA		NA		ESA, 9/4/91
WSP-17	1/25/88	4.9B		219		4000EJ		14500		1250		980		Hill/CN, 1989
WSP-17	5/24/88	2U		11.7		2360		68300		1180		1110J		Hill/CN, 1989
WSP-17	9/91	7.7		1U		NA		NA		944		NA		ESE 1/92
WSP-17	01/15/92	9.6		3	U	0		0		851				ASMGW92A
WSP-17	01/15/92	8.5		3	U	0		0		862				ASMGW92A
WSP-17	01/15/92	9.5		3	U	0		0		894				ASMGW92A
WSP-17	06/13/92	5.4	J	3	UJ	0		0		772	J			ASMGW92D
WSP-17	9/92	12.6	UB							828			E	ESE, 1/93
WSP-17	01/04/93	8.5		3.9	U	0		0		800	UR	876	(D)	ASMGW93A
WSP-17	05/21/93	13.2	U	0.08	U	0		0		840				ASMGW93C
WSP-18D	1/20/88	2U		5U		27EJ		3630		29		250		Hill/CN, 1989
WSP-18D	5/24/88	2UW		5.8		174		28000		69.2		335J		Hill/CN, 1989
WSP-18S	1/20/88	4B		5U		40EJ		91		30J		510		Hill/CN, 1989
WSP-18S	5/24/88	2.9B		10.9		56U		27300		18.8BJ		420J		Hill/CN, 1989
WSP-19D	1/26/88	2U		5U		15U		97		27		460		Hill/CN, 1989
WSP-19D	5/24/88	2UW		8.4		56U		46200		6.2BJ		484J		Hill/CN, 1989
WSP-19D	01/16/92	2	U	1	U	0		0		2	U			ASMGW92A
WSP-19D	06/14/92	1	UJ	4		0		0		2	U			ASMGW92D
WSP-19D	9/92	3.6	UB							12	UB		E	ESE, 1/93
WSP-19D	01/04/93	1.8		3.9	U	0		0		14	UR	598	(D)	ASMGW93A
WSP-19D	05/21/93	1.3	U	0.04		0		0		11				ASMGW93C
WSP-19S		2U		7.1		NA		NA		NA		NA		ESA, 9/4/91
WSP-19S		2U		5		NA		NA		NA		NA		ESA, 9/4/91
WSP-19S	1/26/88	2U		5		3630EJ		11600		48		980		Hill/CN, 1989

APPENDIX

WELL NUMBER	DATE	As (ug/L)		Cd (ug/L)		Fe (ug/L)		Mn (ug/L)		Zn (ug/L)		SO4 (mg/L)		REFERENCE
WSP-19S	5/24/88	2UW		7.1		8650		67900		16.6BJ		1030J		Hill/CN, 1989
WSP-19S	01/16/92	2.7	J	1	U	0		0		2	U			ASMGW92A
WSP-19S	06/14/92	1.2	J	3	U	0		0		3.5				ASMGW92D
WSP-19S	9/92	6								20			E	ESE, 1/93
WSP-19S	01/04/93	4		3.9	U	0		0		16	UR	739	(D)	ASMGW93A
WSP-19S	05/21/93	3.4	U	0.42	U	0		0		24	U			ASMGW93C
WST2	10/24/85	1.1		2U		4		1		55		39.4		USGS
WST3	9/17/86	8.5		3		1670		3360		3U		452		USGS
	1/27/87	6.7		6		1890		2730		3U		712		USGS
	8/4/87	8.1		2U		1170		1080		3U		345		USGS
	8/29/89	9.1		5U		541		63		10		664		USGS
WST3A	8/4/87	0.9		2U		1U		1320		3U		147		USGS

NOTES:

U = Below detection limit
NA = not analyzed
W = post digestion spike for GFAA outside control limits
G = GFAA analytical spike control limits exceeded
N = lab spike sample results outside control limits
S = matrix spike control limits exceeded
J = estimated due to QC problems
L = LCS control limits exceeded
Q = qualified as undetected because of blank contamination
B = value less than contract but greater than instrument detection limit
E = estminated due to interference

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ASMGW90A: OLD WORKS WATER QUALITY DATA SUMMARY REPORT, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

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Tetra Tech, 1985: ARBITER WORKS DRAFT REMEDIAL INVESTIGATION, August, 1985.

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and: GROUNDWATER INVESTIGATION DATA REPORT SPRING 1985, July, 1985

Data from the above sources can also be found in : ANACONDA SMELTER RI/FS PHASE I DATA COMPILATION, Tetra Tech, 1986.

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USGS: WATSTORE

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ESE 11/92: DATA SUMMARY REPORT FOR THE ANACONDA REGIONAL WATER AND WASTE INVESTIGATION, FOURTH QUARTER 1992, DRAFT, APRIL 1993

APPENDIX E

Groundwater Quality Data for Parameters Exceeding Drinking Water Standards, Anaconda, Montana (adjusted for detection limits)

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
1	9/14/82	2.5	U	2.5	U	50		10	U	60		50		ARCO, 1994
1	10/17/85	3.00	U	1	U	328		34		134		97.8		Tetra Tech, 1986
1	5/1/85	3.05	U	2	U	13.1		29		175		149		Tetra Tech, 1986
	MEDIAN	3	3	2	3	50	3	29	3	134	3	97.8	3	
3	9/14/82	2.5	U	2.5	U	50	U	10	U	40		482		ARCO, 1994
3	4/24/85	3.05	U	2	U	73.3		8		32		500		Tetra Tech, 1986
3	10/18/85	4		1	U	23		2		14		571		Tetra Tech, 1986
3	07/23/87	12		6		250		1080		110		62	(D)	CFUGW87A
3	07/23/87	12		2.5	U	280		1080		110				CFUGW87A
	MEDIAN	4	5	2.5	5	73 3	5	10	5	40	5	491	4	
9	4/24/85	3.05	U	2	U	104		10		67		21		Tetra Tech, 1986
9	10/17/85	1.5	U	1	U	32		6		128		26.1		Tetra Tech, 1986
OP-1	12/17/85	2.5	U	1	U	22		76		285		18		Tetra Tech #4, 1986
	MEDIAN	2.5	3	1	3	32	3	10	3	128	3	21	3	
10	9/14/82	9		2.5	U	73		200		60		74		ARCO, 1994
10R	4/26/85	71		1	U	55.1		26		19		37		Tetra Tech #4, 1986
10R	10/16/85	1.5	U	1	U	82		23		10		39.4		Tetra Tech #4, 1986
	MEDIAN	9	3	1	3	73	3	26	3	19	3	39.4	3	
11	9/14/82	2.5	U	2.5	U	25	U	20		70		16		ARCO, 1994
11	4/24/85	71				70.4		3		13		15		Tetra Tech, 1986
11	10/17/85	1.5		1		10	U	1		7		17		Tetra Tech, 1986
OP-3	12/17/85	2.5		1		19		59		36		17		Tetra Tech #4, 1986
	MEDIAN	2.5	4	1	3	22	4	11.5	4	24.5	4	16.5	4	
16	9/14/82	2.5	U	2.5	U	100		10	U	20		680		ARCO, 1994
16	4/24/85	3.05				346		21		174		370		Tetra Tech, 1986
16	10/15/85	1.5		1		47		14		46		44.7		Tetra Tech, 1986
	MEDIAN	2.5	3	1.75	2	100	3	14	3	46	3	370	3	
18	9/14/82	2.5	U	2.5	U	50	U	10	U	260		57		ARCO, 1994
18	4/23/85	1.5		2		888		22		123		27		Tetra Tech, 1986
18	10/15/85	3.05		1		25		10		109		29.6		Tetra Tech, 1986
18	/ /	1.5	U	1	U	33		11		105				ASMGW85A
18	/ /	1.5	U	1	U	41		10		108				ASMGW85A
	MEDIAN	1.5	5	1	5	41	5	10	5	109	5	29.6	3	
19	9/14/82	2.5	U	2.5	U	170		10	U	40		189		ARCO, 1994
19R	4/24/85	3		2		61.2		19		29		73		Tetra Tech, 1986
19R	10/18/85	4		1		46		25		12		815		Tetra Tech, 1986
	MEDIAN	3	3	2	3	61.2	3	19	3	29	3	189	3	
20	2/15/85	2.3		6.5		214		43.8		2070		47		Tetra Tech, 1985
20	2/16/85	2.3		5.4		96		85.5		1904		63		Tetra Tech, 1985

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
	MEDIAN	2.3	2	5.95	2	155	2	64.65	2	1987	2	55	2	
24	9/14/82	2.5	U	2.5	U	2000		200		20		292		ARCO, 1994
24	04/24/85	3.05	UJ	2	U	820		1900		30	J	250	(D)	ASMGW85A
24	10/18/85	4		1		515		1740		17		259		Tetra Tech, 1986
	MEDIAN	3.05	3	2	3	820	3	1740	3	20	3	259	3	
26	9/15/82	2.5	U	2.5	U	6160		35200		30		1860		ARCO, 1994
26	4/24/85	3.05		2		5722		35920		41		1700		Tetra Tech, 1986
26	10/18/85	4		1		5400		36400		29		1790		Tetra Tech, 1986
	MEDIAN	3.05	3	2	3	5722	3	35920	3	30	3	1790	3	
27	9/15/82	2.5	U	2.5	U	7450		23700		30		1910		ARCO, 1994
27	4/24/85	3.05		2		11290		25090		13		1620		Tetra Tech, 1986
27	10/18/85	4		1		10400		24900		23		1700		Tetra Tech, 1986
	MEDIAN	3.05	3	2	3	10400	3	24900	3	23	3	1700	3	
28	9/15/82	16		2.5	U	18600		16100		50		2010		ARCO, 1994
401	1/17/85	21		0.4		37000		NA		13.5		1960		Stiller, 1985
28	10/17/85	24		1		96000		57800		202		2190		Tetra Tech, 1986
28	4/24/85	14		2		80140		47250		166		2110		Tetra Tech, 1986
	MEDIAN	18.5	4	1.5	4	58570	4	47250	3	108	4	2060	4	
29	9/15/82	2.5	U	2.5	U	4530		24400		110		2420		ARCO, 1994
340	1/17/85	44		0.4		22000		NA		70		2040		Stiller, 1985
29	4/25/85	3		2		17680		54340		42		2060		Tetra Tech, 1986
29	10/17/85	9		1		30900		25400		41		2180		Tetra Tech, 1986
	MEDIAN	6	4	1.5	4	19840	4	25400	3	56	4	2120	4	
30	9/15/82	14		6		3920		360		30		1210		ARCO, 1994
30	4/25/85	3.05		2		6039		116		58		1190		Tetra Tech, 1986
30	10/17/85	3		1		2710		457		16		1240		Tetra Tech, 1986
	MEDIAN	3.05	3	2	3	3920	3	360	3	30	3	1210	3	
31	9/15/82	2.5	U	2.5	U	580		240		70		1140		ARCO, 1994
31	4/25/85	3.05		2		248		81		64		1200		Tetra Tech, 1986
31	10/17/85	4		1		435		52		51		1570		Tetra Tech, 1986
	MEDIAN	3.05	3	2	3	435	3	81	3	64	3	1200	3	
32	9/15/82	2.5	U	2.5	U	1580		790		20		1050		ARCO, 1994
32	9/16/82	2.5	U	2.5	U	1670		830		20		1050		ARCO, 1994
32	4/25/85	3.05		2		1746		42		82		669		Tetra Tech, 1986
32	10/17/85	3		1		1830		332		36		1050		Tetra Tech, 1986
	MEDIAN	2.75	4	2.25	4	1708	4	561	4	28	4	1050	4	
33	9/16/82	2.5	U	2.5	U	2260		520		30		143		ARCO, 1994
33	4/25/85	3.05		2		10810		297		30		31		Tetra Tech, 1986

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
33	10/17/85	3		1		12700		316		23		42.5		Tetra Tech, 1986
	MEDIAN	3	3	2	3	10810	3	316	3	30	3	42.5	3	
34	9/16/82	2.5	U	10		510		290		1760		176		ARCO, 1994
34	9/16/82	2.5	U	9		540		270		1540		180		ARCO, 1994
34	2/15/85	2.3		8.9		279		174		649		30		Tetra Tech, 1986
34	2/16/85	2.3		9.4		484		166		737		35		Tetra Tech, 1986
	MEDIAN	2.4	4	9.2	4	497	4	222	4	1138.5	4	105.5	4	
35	9/16/82	75		2.5	U	50		10	U	20		157		ARCO, 1994
35	4/23/85	21		2		786		46		12		69		Tetra Tech, 1986
35	10/15/85	27		1		439		32		21		65		Tetra Tech, 1986
	MEDIAN	27	3	2	3	439	3	32	3	20	3	69	3	
36	9/16/82	14		2.5	U	4720		80		500		1190		ARCO, 1994
36	4/22/85	19		2		8366		157		634		1160		Tetra Tech, 1986
36	10/14/85	27		1		7150		182		769		1190		Tetra Tech, 1986
	MEDIAN	19	3	2	3	7150	3	157	3	634	3	1190	3	
37	9/16/82	2.5	U	2.5	U	4400		10100		50		1450		ARCO, 1994
37	4/22/85	3.05		2		16510		10960		148		1360		Tetra Tech, 1986
37	10/14/85	1.5		1		16600		12000		57		1380		Tetra Tech, 1986
	MEDIAN	2.5	3	2	3	16510	3	10960	3	57	3	1380	3	
38	9/16/82	2.5	U	2.5	U	1140		70		130		938		ARCO, 1994
39	9/16/82	2.5	U	2.5	U	120		10	U	10		252		ARCO, 1994
39	4/22/85	3.05		2		107		33		136		176		Tetra Tech, 1986
39	10/14/85	1.5		1		57		7		8		178		Tetra Tech, 1986
	MEDIAN	2.5	3	2	3	107	3	10	3	10	3	178	3	
48	2/15/85	6		2		29		1.5		982		22		Tetra Tech, 1985
48	2/16/85	2.3		2		23		4.7		762		NA		Tetra Tech, 1985
	MEDIAN	2.4	2	2	2	26	2	3.1	2	386	2	22	1	
49	9/16/82	2.5	U	2.5	U	25	U	20	U	450		177		ARCO, 1994
49	9/16/82	2.5	U	2.5	U	50		20	U	530		180		ARCO, 1994
49	2/15/85	2.3		2		7.8	U	13.3		126		25		Tetra Tech, 1985
49	2/16/85	2.3		2		9.3		27		91		27		Tetra Tech, 1985
	MEDIAN	2.4	4	2.25	4	17.15	4	20	4	288	4	102	4	
50	2/18/85	2.3		2		64		53.5		87		53		Tetra Tech, 1985
50	2/18/85	2.3		2		58		40.4		111		49		Tetra Tech, 1985
	MEDIAN	2.3	2	2	2	61	2	46.95	2	99	2	51	2	
51	4/23/85	3.05		2		62.5		25		17		39		Tetra Tech, 1986
51	10/15/85	1.5		1		39		6		14		22.4		Tetra Tech, 1986

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
	MEDIAN	2.275	2	1.5	2	50.75	2	15.5	2	15.5	2	30.7	2	
52	2/18/85	2.3		2		228		37		1.65		56		Tetra Tech, 1986
52	2/18/85	2.3		2		119		18.6		1.65		56		Tetra Tech, 1986
	MEDIAN	2.3	2	2	2	173.5	2	27.8	2	1.65	2	56	2	
59	4/24/85	3.05		2		47.7		3		107		15		Tetra Tech, 1986
59	10/18/85	1.5		1		10	U	1		45		15.4		Tetra Tech, 1986
	MEDIAN	2.275	2	1.5	2	28.85	2	2	2	76	2	15.2	2	
65	07/28/93	3.55	U	0.43	UJ	12.3	U	2.05	U	11.5				ASMGW93F
66	9/13/82	2.5	U	2.5	U	150		30		310		329		ARCO, 1994
68	07/28/93	2.55	U	0.345	UJ	11.2	U	2.05	U	10.6				ASMGW93F
69	2/18/85	2.3		2		70		25.1		1.65		190		Tetra Tech, 1985
69	2/18/85	12		2		604		37.7		1.65		190		Tetra Tech, 1985
69	4/24/85	3.05		2		142		22		42		309		Tetra Tech, 1986
69	10/15/85	1.5		1		264		24		16		215		Tetra Tech, 1986
	MEDIAN	2.675	4	2	4	203	4	24.55	4	8.825	4	202.5	4	
403	1/17/85	1.65		0.4		1600		NA		13.5		1520		Stiller, 1985
70	4/23/85	3.05		2		2570		87		92		1440		Tetra Tech, 1986
70	10/16/85	1.5		1		2430		87		14		1160		Tetra Tech, 1986
	MEDIAN	1.65	3	1	3	2430	3	87	2	14	3	1440	3	
404	1/17/85	1.65		0.4		590		NA		13.5		766		Stiller, 1985
71	4/23/85	3.05		2		223		28		5		1071		Tetra Tech, 1986
71	10/16/85	1.5		1		745		33		16		1160		Tetra Tech, 1986
	MEDIAN	1.65	3	1	3	590	3	30.5	2	13.5	3	1071	3	
72	4/23/85	3.05		2		51		20		684		63		Tetra Tech, 1986
72	10/16/85	1.5		4		20		1		641		24.3		Tetra Tech, 1986
72	3/91	1		1.5		12.5		1		591		55.1		ESE 6/91
72	9/91	1		3.5		5.5		0.5	U	635		79.2		ESE 1/92
72	12/91	3.4		2.8		5.5		0.5	U	477		55.6		ESE 3/92
72	06/27/91	1	U	1	U	6	U	1	U	439				ASMGW91B
72	02/17/92	0.5	U	4.1		7		1	U	463				ASMGW92B
72	9/92	2.6	UB	2.55	UBP	27	UB	1.3	UB	589		52	E	ESE, 1/93
72	11/92	2.05	UBR	2.7		12.5	UBB	1.65	U	525		49	E	ESE, 4/93
72	02/08/93	1.6		2.7		128		128		543				ASMGW93B
72	02/08/93			2.7										ASMGW93B
72	05/11/93	0.75	U	3.7		6	U	2.6	U	502				ASMGW93D
72	07/13/93	0.5	U	1.3	U	6.75	U	2.6	U	443		84	(D)	ASMGW93E
	MEDIAN	1.25	12	2.7	13	9.75	12	1.15	12	534	12	55.35	8	

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
73	5/4/85	2070		18.2		10250		4705		230		1260		Tetra Tech, 1986
73	10/25/85	840		9		2110		1050		101		758		Tetra Tech, 1986
	MEDIAN	1455	2	13.6	2	6180	2	2877.5	2	165.5	2	1009	2	
75	4/22/85	3.05		48.7		1965		112800		18410		1900		Tetra Tech, 1986
75	10/14/85	1.5		21		2480		73600		12700		1760		Tetra Tech, 1986
75	05/19/93	0.5	U	7.9		29300		6030		477				ASMGW93D
	MEDIAN	1.5	3	21	3	2480	3	73600	3	12700	3	1830	2	
76	4/12/85	3.05		2		2484		262		61		836		Tetra Tech, 1986
76	10/15/85	1.5		1		2800		235		22		865		Tetra Tech, 1986
76	9/91	1		1		2410	E	237		2.3		784.9		ESE 1/92
76	02/18/92	0.5	U	1.5	U	2340		216		5.65	UJ			ASMGW92B
76	05/29/92	0.5	UJ	1.5	U	2040		210		2.7	U	786	()	ASMGW92C
76	9/92	3.2	JGS	2.5	UB	231		223		5.75	U	719	E	ESE, 1/93
76	11/92	1.55	UBB	1.95	U	2190		214		10	UBR	739	E	ESE, 4/93
76	02/04/93	2.9		1.1	U	2280		225		9		720	(D)	ASMGW93B
76	05/18/93	2.2		0.055	U	2340		226		10				ASMGW93D
76	07/19/93	1	U	1.3	U	2290		224		3.8	UJ			ASMGW93E
	MEDIAN	1.525	10	1.4	10	2315	10	224.5	10	7.375	10	739	7	
77	4/23/85	3.05		2		36		222		22		45		Tetra Tech, 1986
77	10/16/85	1.5		1		691		156		16		49.55		Tetra Tech, 1986
77	05/13/93	2.2		0.055	U	6.75	U	5		13	U			ASMGW93D
	MEDIAN	2.2	3	1	3	36	3	156	3	16	3	47.275	2	
78	04/25/85	3 05	U	2	U	16100		48600	J	21	J			ASMGW85A
78	04/25/85	3.05	U	2	U	80.8	J	32	J	79	J			ASMGW85A
78	04/25/85	3.05	U	2	U	62.8	J	56	J	37	J			ASMGW85A
78	04/26/85	3.05	U	2	U	56.8	J	35	J	55	J	1290	(D)	ASMGW85A
78	05/02/85	3.05	U	2	UJ	26 6		14	J	12	J			ASMGW85A
78	10/16/85	1.5		1		10	U	3		14		1190		Tetra Tech, 1986
78	9/91	0.5		0.5	U	13.4		3.6		4.4		1250		ESE 1/92
78	02/18/92	0.5	U	1.5	U	4.3	U	1	U	1	U			ASMGW92B
78	06/01/92	0.5	UJ	1.5	U	13.5	U	3	U	1.55	U	1459	()	ASMGW92C
78	9/92	1.65	UB	1.65	U	6	UBP	1	UB	25		1470	E	ESE, 1/93
78	11/92	1.7	UBR	1.95	U	16	UBB	1.55	U	15	UBP	1360	E	ESE, 4/93
78	02/10/93	6.8	UJ	1.1	U	14	U	3.9	U	19	U			ASMGW93B
78	05/13/93	4	J	0.055	U	8	U	4		8.5	U			ASMGW93D
78	07/14/93	0.85	U	1.3	U	6.75	U	2.6	U	10.7	U			ASMGW93E
	MEDIAN	2.375	14	1.575	14	13.75	14	3.75	14	13.5	14	1325	6	
79	4/24/85	3.05		2		119		14450		30		1260		Tetra Tech, 1986
79	10/18/85	4		1		75		15200		28		1320		Tetra Tech, 1986
79	9/91	17.9		1		5.5		16200		8.4		1530		ESE 1/92
79	02/17/92	0.5	U	1.5	U	5.25	U	18300		1.75				ASMGW92B
79	05/29/92	0.5	UJ	5.3		13.5	U	14900		1	U	1580	()	ASMGW92C

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
79	9/92	0.65	UJS	1.65	UJD	5.3	UBP	16400		36.8		1720	E	ESE, 1/93
79	11/92	1.8	UBR	1.95	U	3.4	UBB	15300		18.5	UBP	1480	E	ESE, 4/93
79	02/10/93	3.3	UJ	1.1	U	21	U	14400		19	U			ASMGW93B
79	05/13/93	4.1	J	0.055	U	14	U	15800		8.5	U			ASMGW93D
79	07/15/93	1.75	UJ	1.3	U	5.4	U	13700		13.7				ASMGW93E
	MEDIAN	2.425	10	1.4	10	9.5	10	15250	10	16.1	10	1505	6	
80	4/26/85	3.05		2		452		185		40		220		Tetra Tech, 1986
80	10/16/85	1.5		1		28		4		5		212		Tetra Tech, 1986
	MEDIAN	2.275	2	1.5	2	240	2	94.5	2	22.5	2	216	2	
81	4/25/85	6.1		2		105		2187		595		977		Tetra Tech, 1986
81	10/17/85	4		1		56		449		31		1040		Tetra Tech, 1986
81	9/91	0.5		1		15.9		81.5		8.4		1590		ESE 1/92
81	02/17/92	0.5	U	1.5	U	16.45	U	45.9		3.2	UJ			ASMGW92B
81	05/29/92	0.5	UJ	1.5	U	1.35	U	39.1		1	U	1531	()	ASMGW92C
81	9/92	0.65	UJS	1.65	U	24.65	UB	61.1	JI	27.2		1620	E	ESE, 1/93
81	11/92	1.5	UBR	0.05	U	20.5	UBB	48		14	UBP	1500	E	ESE, 4/93
81	02/10/93	3.2	UJ	1.1	U	15.5	U	35		18	U			ASMGW93B
81	05/13/93	1.55	J	0.055	U	8	U	32		6.5	U			ASMGW93D
81	07/14/93	0.85	U	1.3	U	6.75	U	32.3		10.2	U			ASMGW93E
	MEDIAN	1.175	10	1.2	10	16.175	10	46.95	10	12.1	10	1515.5	6	
82	4/25/85	3.05		4.5		2130		33290		256		2040		Tetra Tech, 1986
82	10/21/85	2.5		1		2150		35300		68		1830		Tetra Tech, 1986
	MEDIAN	2.775	2	2.75	2	2140	2	34295	2	162	2	1935	2	
84	4/25/85	587		2		46880		26220		811		1790		Tetra Tech, 1986
84	10/21/85	410		6		43200		25300		34		1710		Tetra Tech, 1986
	MEDIAN	498.5	2	4	2	45040	2	25760	2	422.5	2	1750	2	
85	4/26/85	59		2		46900		19090		206		1760		Tetra Tech, 1986
85	10/21/85	78		1		44200		19700		34				Tetra Tech, 1986
	MEDIAN	68.5	2	1.5	2	45550	2	19395	2	120	2	1760	1	
88	5/2/85	387		5.8		28460		18810		1038		1650		Tetra Tech, 1986
88	10/21/85	640		11		31100		16600		712		1640		Tetra Tech, 1986
	MEDIAN	513.5	2	8.4	2	29780	2	17705	2	875	2	1645	2	
89	4/26/85	906		6		28850		6357		35		690		Tetra Tech, 1986
89	10/21/85	870		15		28300		6580		25		638		Tetra Tech, 1986
	MEDIAN	888	2	10.5	2	28575	2	6468.5	2	30	2	664	2	
90	4/24/85	435		2		27550		5590		49		50		Tetra Tech, 1986
90	10/18/85	324		1		27700		5720		40		574		Tetra Tech, 1986
90	9/91	257		2.7		23400		5930		62.3		552		ESE 1/92
90	9/91	280		2		23100		6030		68.7		555		ESE 1/92

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
90	9/91	287		1		23300		5830		70.3		554		ESE 1/92
90	02/18/92	288		1.5	U	22700		5310		12.9	UJ			ASMGW92B
90	05/29/92	302		1.5	U	20900		5070		10.15	U	557	()	ASMGW92C
90	9/92	282		2.5	UB	23900		5940		39		520	E	ESE, 1/93
90	11/92	255		0.05	U	19000		4890		13	UBR	560	E	ESE, 4/93
90	02/05/93	254		1.1	U	19800		4880		31		495	(D)	ASMGW93B
90	05/17/93	291		0.055	U	19700		5020		23				ASMGW93D
90	07/20/93	284		0.08	U	18400		4600		24.8				ASMGW93E
	MEDIAN	285.5	12	1.3	12	22900	12	5450	12	35	12	554	9	
91	4/24/85	2724		20.6		165600		74710		325		2120		Tetra Tech, 1986
91	10/21/85	3600		68		188000		69000		160		2070		Tetra Tech, 1986
	MEDIAN	3162	2	44.3	2	176800	2	71855	2	242.5	2	2095	2	
93	4/24/85	8177		73.4		553400		576600		24380		5340		Tetra Tech, 1986
93	10/22/85	9100		169		1720000		553000		38000		5980		Tetra Tech, 1986
	MEDIAN	8638.5	2	121.2	2	1136700	2	564800	2	31190	2	5660	2	
94	4/25/85	81		4.2		102		4216		188		1170		Tetra Tech, 1986
94	10/18/85	3		1		35		3920		166		1180		Tetra Tech, 1986
	MEDIAN	42	2	2.6	2	68.5	2	4068	2	177	2	1175	2	
96	10/22/85	660		14		151		4		34		97.9		Tetra Tech, 1986
97R	10/25/85	3300		29		1970		675		449		266		Tetra Tech, 1986
98	10/22/85	400		502		38		23		58400		934		Tetra Tech, 1986
99	4/25/85	3.05		2		63.8		4		78		25		Tetra Tech, 1986
99	10/18/85	3		1		26		1		13		29.5		Tetra Tech, 1986
	MEDIAN	3.025	2	1.5	2	44.9	2	2.5	2	45.5	2	27.25	2	
100	4/25/85	3.05		2		55.1		3		15		72		Tetra Tech, 1986
100	10/18/85	5		1		20		1		87		59.8		Tetra Tech, 1986
	MEDIAN	4.025	2	1.5	2	37.55	2	2	2	51	2	65.9	2	
200	12/90	0.9		2.15		45.5		4.8		19		33.1		ESE 6/91
200	11/16/90	0.4	U	1.15	U	143.5		25.6		33.4				ASMGW90A
200	3/91	1		1.5		12.5		0.5		5		27.3		ESE 6/91
200	6/91	1		1		6		0.5		1		114		ESE 9/91
200	9/91	1		1		5.5		0.5		9.9		46		ESE 1/92
200	12/91	1		1		13.4		1.4		1		36.4		ESE 3/92
200	02/13/92	0.5	U	0.5	U	3	UJ	2	U	1	U			ASMGW92B
200	05/27/92	0.5	UJ	1.5	U	13.5	U	3	U	4.1		29.1	()	ASMGW92C
200	9/92	0.65	U	1.65	U	20	UBP	2		5.75	U	28	E	ESE, 1/93
200	11/92	0.65	U	1.95	U	17	UBP	1.55	U	2.85	U	28	E	ESE, 4/93
200	02/07/93	0.65	U	1.1	U	4.6	U	3.9	U	3.15	U	27	(D)	ASMGW93B

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
200	05/10/93	0.65	U	0.04	U	6.75	U	2.6	U	7				ASMGW93D
200	07/12/93	1.65	U	1.3	U	5.9	U	4.1	U	3.8	U			ASMGW93E
	MEDIAN	0.65	13	1.15	13	12.5	13	2	13	4.1	13	29.1	9	
201	11/15/90	0.1	U	1.45	U	7.7	B	13.9		129.4				ASMGW90A
201	12/90	0.9		2.15		99.4	Q	10		117		24.7		ESE 6/91
201	3/91	1		1.5		12.5		0.5		115		25.7		ESE 6/91
201	6/91	1		1		6		3.4		119		46		ESE 9/91
201	9/91	1		1		5.5		1.3		120		24.8		ESE 1/92
201	12/91	1		1		5.5		0.5		72.6		22.9		ESE 3/92
201	02/14/92	0.5	U	1.3		3	UJ	2	U	73.6				ASMGW92B
201	05/28/92	0.5	UJ	1.5	U	13.5	U	3	U	102		25.9	()	ASMGW92C
201	9/92	1.8		2	UB	13.5	UBP	2		98		23	E	ESE, 1/93
201	11/92	1.9		1.95	U	27.5	UBP	1.55	U	102		21	E	ESE, 4/93
201	02/07/93	0		0.86										ASMGW93B
201	02/07/93	2.3		0.9		4.6	U	3.9	U	88				ASMGW93B
201	02/07/93	0.65	U	3		21.5	U	5	U	80				ASMGW93B
201	05/10/93	0.65	U	1		6.75	U	2.6	U	101				ASMGW93D
201	05/10/93	0.65	U	0.93		6.75	U	2.6	U	105				ASMGW93D
201	07/12/93	1.45	U	0.7	U	9.3	U	4.1	U	162				ASMGW93E
	MEDIAN	0.95	16	1.15	16	7.7	15	2.6	15	102	15	24.7	8	
202	11/16/90	0.1	U	1.35	U	16.1	B	49.7		224.3				ASMGW90A
202	12/90	0.9		2.15		129		41.2		275		26.9		ESE 6/91
202	3/91	1		1.5		12.5		21.9		269		27.2		ESE 6/91
202	6/91	1		1		6		10.3		327		87.3		ESE 9/91
202	9/91	1		1		5.5		7.2		258		24.8		ESE 1/92
202	12/91	1		1		5.5		4.2		228		23.7		ESE 3/92
202	02/13/92	0.5	U	0.5	U	3	UJ	2	U	252				ASMGW92B
202	05/27/92	0.75	J	1.5	U	13.5	U	3	U	248		31.4	()	ASMGW92C
202	9/92	2.35	UB	1.8	UBP	16.65	UBP	1.3	UB	216		25	E	ESE, 1/93
202	11/92	0.65	U	1.95	U	20.5	UBP	1.55	U	209		24	E	ESE, 4/93
202	02/07/93	0.8		0.7		4.6	U	4		182				ASMGW93B
202	02/07/93	0		0.7										ASMGW93B
202	05/10/93	0.65	U	0.8	J	11.5	U	5	U	194				ASMGW93D
202	07/12/93	1.8	U	1.3	U	6.65	U	4.1	U	189				ASMGW93E
	MEDIAN	0.85	14	1.15	14	11.5	13	4.2	13	228	13	25.95	8	
203	11/13/90	0.625	U	4.7	B	8.5	B	21.9		2167				ASMGW90A
203	12/90	2.6		6.1		1070		41		2050		46.9		ESE 6/91
203	3/91	1		1.5		12.5		2.2		1680		39.9		ESE 6/91
203	6/91	1		3550		3		795		34400		579		ESE 9/91
203	9/91	1		13.5		5.5		42.6		9380	E	90.3		ESE 1/92
203	12/91	1		9		5.5		1.8		4180		54.1		ESE 3/92
203	02/14/92	0.5	U	6.8		3	UJ	2	U	2890				ASMGW92B
203	02/14/92	0.5	U	6.8		3	UJ	2	U	2910				ASMGW92B
203	05/28/92	0.5	UJ	5		13.5	U	3	U	2530		41.7	()	ASMGW92C

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
203	9/92	1.95	UB	4.5	UBP	11.5	UBP	1	U	1990		40	E	ESE, 1/93
203	11/92	0.65	U	7		23	UBP	1.55	U	1730		36	E	ESE, 4/93
203	02/08/93	0.65	U	8		47.5		3.9	U	2360				ASMGW93B
203	02/08/93	0.65	U	12		4.6	U	5		5240		198	(D)	ASMGW93B
203	05/11/93	0.65	UJ	6.4		14.5	U	3	U	3180				ASMGW93D
203	07/15/93	1.6	U	66.6		5.9	U	928		33200				ASMGW93E
	MEDIAN	0.65	15	6.8	15	8.5	15	3	15	2890	15	46.9	9	
204	11/13/90	0.625	U	0.1	U	15.5	B	5	B	431.1				ASMGW90A
204	12/90	0.9		2.15		80.4	Q	0.9		382		33.1		ESE 6/91
204	3/91	1		1.5		12.5		0.5		332		28.3		ESE 6/91
204	6/91	1		4.1		6		19.6		2560		142		ESE 9/91
204	9/91	1		1		5.5		1.6		867		38.8		ESE 1/92
204	12/91	1		2.7		11.7		0.5		573		32.1		ESE 3/92
204	12/91	1		3		5.5		0.5		510		32.1		ESE 3/92
204	02/14/92	0.5	U	1.3		3	UJ	2	U	372				ASMGW92B
204	05/28/92	5	UJ	0.75	U	13.5	U	3	U	424		34.4	()	ASMGW92C
204	9/92	0.65	U	2.5	UB	12	UBP	1	U	322		33	E	ESE, 1/93
204	11/92	0.65	U	1.3		14	UBP	1.55	U	321		31	E	ESE, 4/93
204	02/07/93	0		1.2										ASMGW93B
204	02/07/93	1.7		1.2		5	U	3.9	U	285		26	(D)	ASMGW93B
204	05/11/93	1.15	U	1.2		6.75	U	2.6	U	276				ASMGW93D
204	07/15/93	0.75	UJ	6.7		8.65	U	82.9		4730				ASMGW93E
	MEDIAN	1	15	1.3	15	10.175	14	1.8	14	403	14	32.55	10	
205	9/91	4.8		1		5.5		2.7		37.5		67.5		ESE 1/92
205	12/91	4.6		2.4		5.5		1.7		92		48.1		ESE 3/92
205	02/14/92	5.2		1.1		3	UJ	2	U	62.9				ASMGW92B
205	05/28/92	5.1	J	1.5	U	13.5	U	3	U	102		50.9	()	ASMGW92C
205	9/92	3.75	UB	5	UBP	35	UB	3	UB	140		40	E	ESE, 1/93
205	11/92	6.3		2	UBR	25.5	UBP	1.55	U	120		41	E	ESE, 4/93
205	02/08/93			1.5										ASMGW93B
205	02/08/93	6.5		1.1	U	4.6	U	3.9	U	114		61	(D)	ASMGW93B
205	02/08/93	5.9		1.4		7	U	3.9	U	109				ASMGW93B
205	05/11/93	3.05	U	1.4		6.75	U	2.6	U	102				ASMGW93D
205	07/13/93	5.4		1.7		7.6	U	5.8	U	114				ASMGW93E
	MEDIAN	5.15	10	1.5	11	6.875	10	2.85	10	105.5	10	49.5	6	
206	9/91	1		17.8		5.5		1.8		2050		67.4		ESE 1/92
206	9/91	1		15.8		12.2		2.3		2070		67.1		ESE 1/92
206	9/91	1		16.2		13.6		1.8		2000		67.7		ESE 1/92
206	12/91	1		19.2		5.5		0.5		2230		46.4		ESE 3/92
206	02/14/92	0.5	U	17.9		3	UJ	2	U	1950				ASMGW92B
206	05/28/92	0.5	UJ	15.8		13.5	U	3	U	2010		44.5	()	ASMGW92C
206	9/92	3.55	UB	12.85	UJD	13.2	UBP	2.15	UB	2550		57	E	ESE, 1/93
206	11/92	1.6		27		26.5	UBP	12		2720		73	E	ESE, 4/93
206	02/08/93	1.3		13.6		4.6	U	3.9	U	1580		82	(D)	ASMGW93B

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
206	02/08/93			13.6										ASMGW93B
206	05/11/93	0.85	U	14.8		6.75	U	2.6	U	1780				ASMGW93D
206	07/15/93	1.75	UJ	26.3		7.4	U	54.7		2830				ASMGW93E
	MEDIAN	1	11	16	12	7.4	11	2.3	11	2050	11	67.25	8	
207	9/91	1		1		5.5		2.1		1	UE	97.4		ESE 1/92
207	12/91	1		1		5.5		1.1		1		84		ESE 3/92
207	02/17/92	0.5	U	1.5	U	8.55	U	2.1		3.4				ASMGW92B
207	05/28/92	0.5	UJ	1.5	U	13.5	U	3	U	1	U	85.2	()	ASMGW92C
207	9/92	2.6	UB	1.65	UJD	12.05	UBP	1	U	5.75	U	88	E	ESE, 1/93
207	11/92	0.65	U	1.95	U	20.5	UBP	1.55	U	3	UBR	82	E	ESE, 4/93
207	02/08/93	0		0.2										ASMGW93B
207	02/08/93	1.5		0.1	U	4.6	U	3.9	U	3.15	U	89	(D)	ASMGW93B
207	05/11/93	0.75	UJ	0.02	U	6.75	U	2.6	U	3	U			ASMGW93D
207	07/13/93	0.49	U	0.02	U	6.75	U	2.6	U	3	U			ASMGW93E
	MEDIAN	0.7	10	1	10	6.75	9	2.1	9	3	9	86.6	6	
208	9/91	1		1		5.5		0.5		5		165.7		ESE 1/92
208	12/91	1		1		5.5		1.8		1		18.4		ESE 3/92
208	05/29/92	0.5	UJ	1.5	U	13.5	U	3	U	1.25	U	16.1	()	ASMGW92C
208	9/92	2.2	UB	1.9	UBP	14.35	UBP	1	U	5.75	U	14	E	ESE, 1/93
208	11/92	0.65	U	1.95	U	22	UBP	1.55	U	2.85	U	14	E	ESE, 4/93
208	02/08/93			0.2										ASMGW93B
208	02/08/93	0.65	U	0.1	U	4.6	U	3.9	U	3.15	U	17	(D)	ASMGW93B
208	05/11/93	1.15	U	0.14		6.75	U	2.6	U	3	U			ASMGW93D
208	07/13/93	0.49	U	1.3	U	8.8	U	5	U	3	U			ASMGW93E
	MEDIAN	0.825	8	1	9	7.775	8	2.2	8	3	8	16.55	6	
209	9/91	1		5.4		5.5		4.3		519		192		ESE 1/92
209	12/91	1		4.3		5.5		0.5		507		95		ESE 3/92
209	02/17/92	0.5	U	5		2	U	1	U	467				ASMGW92B
209	05/29/92	0.5	U	4.6		13.5	U	3	U	616		57.5	()	ASMGW92C
209	9/92	2.6	UB	3.15	UBP	16.65	UBP	1	U	492		49	E	ESE, 1/93
209	11/92	1.6	UBR	4.4		15	UBB	7		486		44	E	ESE, 4/93
209	02/08/93	0.65	UJ	8		4.6	U	3.9	U	608		99	(D)	ASMGW93B
209	05/11/93	0.65	U	4.2		30	U	4	U	484				ASMGW93D
209	07/13/93	0.49	U	9.2		7.6	U	3.3	U	1080				ASMGW93E
	MEDIAN	0.65	9	4.6	9	7.6	9	3.3	9	507	9	76.25	6	
210	06/05/92	70.8		1.5	U	13.5	U	3.8		1	U	31.3	()	ASMGW92C
210	9/92	86.2		0.2	UB	17	UBP	1	U	5.75	U	37	E	ESE, 1/93
210	11/92	47		1.95	U	17.5	UBR	1.55	U	7	UBR	61	E	ESE, 4/93
210	02/03/93	102	J	1.21	U	4.6	U	3.9	U	3.15	U			ASMGW93B
210	05/18/93	93.5		0.63		7	U	2.6	U	17				ASMGW93D
210	07/20/93	90.2		1.3	U	5.9	U	4.1	U	3.8	U			ASMGW93E
	MEDIAN	88.2	6	1.255	6	10.25	6	3.2	6	4.775	6	37	3	

WELL NUMBER	DATE	As		Cd		Fe		Mn		Zn		SO4		REFERENCE
		(ug/L)	n	(ug/L)	n	(ug/L)	n	(ug/L)	n	(ug/L)	n	(mg/L)	n	
211	07/24/92	40.9		1.5	U	7.5	U	5	U	1.5	U	73	()	ASMGW92C
211	9/92	44.9	JS	1.65	UJD	10.35	UBP	2.6	UB	5.75	U	75	E	ESE, 1/93
211	11/92	41		1.95	U	15	UBR	1.55	U	2.85	UBP	72	E	ESE, 4/93
211	02/03/93	60.3	J	1.1	U	4.6	U	3.9	U	3.15	U	48	(D)	ASMGW93B
211	05/19/93	50.3		0		9.5	U	5	U	3.5	U			ASMGW93D
211	07/20/93	61.6		1.3	U	14.7		4.1	U	3.8	U			ASMGW93E
	MEDIAN	47.6	6	1.4	6	9.925	6	4	6	3.325	6	72.5	4	
212	06/05/92	1.1		1.5	U	71.2		6.9		1	U	21.8	()	ASMGW92C
212	9/92	1.9		1.65	U	22.5	UBP	2		5.75	U	19	E	ESE, 1/93
212	11/92	0.65	U	1.95	U	21	UBP	1.55	U	3	UBR	18	E	ESE, 4/93
212 (FR)	11/92	0.65	U	1.95	U	19.5	UBP	1.55	U	3	UBR	17	E	ESE, 4/93
212	02/04/93	1.9	J	1.1	U	10		3 9	U	3.15	U	17	(D)	ASMGW93B
212	05/17/93	0.65	U	0.055	U	6.75	U	2.6	U	7				ASMGW93D
212	07/15/93	1.3	U	1.3	U	5.9	U	4.2		3.8	U			ASMGW93E
	MEDIAN	1.1	7	1.5	7	19.5	7	2.6	7	3.15	7	18	5	
213	06/05/92	0.5	U	1.5	U	13.5	U	7.4		1060		32.7	()	ASMGW92C
213	9/92	1.8		3	UB	77.5	UB	3		812		31	E	ESE, 1/93
213	11/92	0.65	U	2.3		17.5	UBP	1.55	U	786		27	E	ESE, 4/93
213	02/04/93	0		11										ASMGW93B
213	02/04/93	1.3		11		4.6	U	179		7510		94	(D)	ASMGW93B
213	05/17/93	0.65	U	5.3		9	U	11	U	1710				ASMGW93D
213	07/15/93	1.8	UJ	47.6		5.9	U	1020		31100				ASMGW93E
	MEDIAN	0.65	7	5.3	7	11.25	6	9.2	6	1385	6	31.85	4	
214	07/24/92	1.5	J	1.75	U	7.5	U	65.3		2.85	U	811	()	ASMGW92C
214	9/92	0.65	UB	1.65	UJD	17.15	UB	83.1	JI	21 4		828	E	ESE, 1/93
214	11/92	1.5	UBR	1.95	U	21.5	UBB	83		14	UBP	407	E	ESE, 4/93
214	02/10/93	2	UJ	1.1	U	11	U	82		15.5	U			ASMGW93B
214	05/13/93	1.5		0.2		6.75	U	93		6	U			ASMGW93D
214	05/13/93	2.7		0.17		6.75	U	85		4	U			ASMGW93D
214	07/14/93	0.85	U	1.3	U	7.8	U	95.8		5.9	U			ASMGW93E
	MEDIAN	1.5	7	1.3	7	7.8	7	83.1	7	6	7	811	3	
215	07/22/92	2.6	J	12.5		71100		24000		418		1950	()	ASMGW92C
215	9/92	8.3		5	UB	65500		21200		344		2040	E	ESE, 1/93
215	11/92	22.3	JGS	1.95	U	66000		22000		331		1930	E	ESE, 4/93
215	02/04/93	14.1		1.1	U	79900		26200		478		1840	(D)	ASMGW93B
215	05/17/93	15.1		0.055	U	84800		27900		573				ASMGW93D
215	07/19/93	13.3		1.3	U	78100		25700		643				ASMGW93E
	MEDIAN	13.7	6	1.625	6	74600	6	24850	6	448	6	1940	4	
216	07/22/92	3.3	J	1.5	U	231		349		1.5	U	1040	()	ASMGW92C
216	9/92	5.7	JGS	2	UB	108	UB	241		18.9		945	E	ESE, 1/93
216	11/92	1.7	UBR	1.95	U	76	UBR	303		9.5	UBR	877	E	ESE, 4/93
216	02/04/93	6.2		1.1	U	213		374		11		809	(D)	ASMGW93B

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
216	07/19/93	13.2		1.3	U	645		321		8.6				ASMGW93E
	MEDIAN	5.7	5	1.5	5	213	5	321	5	9.5	5	911	4	
217D	07/22/92	0.5	UJ	1.5	U	7.5	U	5	U	1.5	U	16	()	ASMGW92C
217D	9/92	0.65	U	2.5	UB	26.05	UBP	214		5.75	U	15	E	ESE, 1/93
217D	11/92	1.35	UBR	1.95	U	15	UBB	1.55	U	2.85	U	15	E	ESE, 4/93
217D	02/05/93	0.65	U	1.1	U	17.5	U	43		3.3	U	23	(D)	ASMGW93B
217D	05/13/93	1.5		0.02	U	6.75	U	2.6	U	3	UR			ASMGW93D
217D	07/15/93	1.35	U	1.3	U	5.9	U	4.1	U	8.1				ASMGW93E
217S	07/22/92	229	J	1.5	U	26700		7010		202		909	()	ASMGW92C
217S	9/92	279		3	UB	29200		6200		176		920	E	ESE, 1/93
217S	11/92	228		1.95	U	24400		4880		130		815	E	ESE, 4/93
217S	02/05/93			0.055	U									ASMGW93B
217S	02/05/93	269		1.1	U	24500		4540		110		792	(D)	ASMGW93B
217S	02/05/93	259		0.05	U	24700		4590		122		801	(D)	ASMGW93B
217S	05/17/93	352		0.055	U	29600		5460		132				ASMGW93D
217S	07/19/93	339		1.3	U	32500		5810		139				ASMGW93E
	MEDIAN	228	13	1.3	14	24400	13	4540	13	110	13	792	9	
218D	07/23/92	0.5	UJ	1.5	U	7.5	U	15400		10.4		811	()	ASMGW92C
218D	9/92	1.8	UB	0.55	UB	16.5	UBP	14700		5.75	U	777	E	ESE, 1/93
218D	11/92	0.8	UBB	1.95	U	10.5	UBP	14200		13	UBR	747	E	ESE, 4/93
218D	02/03/93	0.65	UJ	1.1	U	4.6	U	14700		26				ASMGW93B
218D	05/15/93	2.2		0.425		6.75	U	14300		3	U			ASMGW93D
218D	07/16/93	3.2	UJ	1.3	U	5.9	U	12900		13.2	U			ASMGW93E
218S	07/23/92	31.6	J	6.3		7.5	U	2920		766				ASMGW92C
218S	9/92	36.7		7.7		11.5	UBP	2960		742		740	E	ESE, 1/93
218S	11/92	36.1		9		19.5	UBR	2970		763		712	E	ESE, 4/93
218S	02/03/93	43.9		5		4.6	U	3240		793				ASMGW93B
218S	05/18/93	45.8		7.4		9.5	U	3280		839				ASMGW93D
218S	07/20/93	38.5		4.95	U	5.9	U	2750		739				ASMGW93E
	MEDIAN	17.4	12	3.45	12	7.5	12	8090	12	382.5	12	747	5	
219	07/23/92	0.5	UJ	1.5	U	7.5	U	9.8		1.5	U	66.3	()	ASMGW92C
219	9/92	3.1	UB	1.65	UJD	13.2	UBP	18.1	JI	17.4		271	E	ESE, 1/93
219	11/92	1.6	UBR	2	U	21.5	UBB	7		7.5	UBP	291	E	ESE, 4/93
219	02/03/93	2.2		1.1	U	4.6	U	5		3.15	U	241	(D)	ASMGW93B
219	05/15/93	1.7		0.06	U	6.75	U	8		3	U			ASMGW93D
219	07/16/93	3	U	1.3	U	5.9	U	4.1	U	4.85	U			ASMGW93E
	MEDIAN	1.95	6	1.4	6	7.125	6	7.5	6	4	6	256	4	
220	07/23/92	1.2	J	1.5	U	7.5	U	5	U	1.5	U	91.8	()	ASMGW92C
220	9/92	2.25	UB	1.65	UJD	15.5	UBP	1.5	UB	5.75	U	42	E	ESE, 1/93
220	11/92	1.9	UBR	1.95	U	11.5	UBB	1.55	U	5.5	UBP	37	E	ESE, 4/93
220	02/09/93	0.85	U	1.1	U	11	U	3.9	U	3.3	U			ASMGW93B
220	05/14/93	2.1		0.02	U	6.75	U	2.6	U	3	U			ASMGW93D
220	07/16/93	3	U	1.3		6.15	U	4.1	U	6.9	U			ASMGW93E

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
	MEDIAN	2	6	1.4	6	9.25	6	3.25	6	4.4	6	42	3	
221	07/23/92	4	J	1.5	U	7.5	U	73.1		1.5	U	97.9	()	ASMGW92C
221	07/23/92	4.1	J	1.5	U	7.5	U	73.1		1.5	U	97.6	()	ASMGW92C
221	9/92	1.4		1.65	U	7	UBP	9.5	UB	5.75	U	97	E	ESE, 1/93
221	11/92	9.6		1.95	U	12.5	UBB	6		3	UBP	99	E	ESE, 4/93
221 (FR)	11/92	9.3		1.95	U	17	UBB	7		4.5	UBP	96	E	ESE, 4/93
221	02/10/93	10.8	J	1.1	U	12.5	U	3.9	U	9	U			ASMGW93B
221	05/12/93	8.2	J	0.02	U	7	U	2.6	U	3	UR			ASMGW93D
221	07/14/93	5.9		1.3	U	6.75	U	2.6	U	3.65	U			ASMGW93E
	MEDIAN	7.05	8	1.5	8	7.5	8	6.5	8	3.325	8	97.6	5	
222	07/23/92	0.5	UJ	1.5	U	7.5	U	15.9		3.6		541	()	ASMGW92C
222	9/92	1.15	UB	1.65	U	7	UBP	10	UB	5.75	U	531	E	ESE, 1/93
222	11/92	2.5	UBR	4		15	UBB	1.55	U	4.5	UBP	255	E	ESE, 4/93
222	02/10/93	3.3	UJ	1.1	U	11	U	3.9	U	10	U			ASMGW93B
222	05/12/93	2.9	J	0.05		9.5	U	2.6	U	3	UR			ASMGW93D
222	07/13/93	0.49	U	1.3	U	7.55	U	2.6	U	3	U			ASMGW93E
	MEDIAN	1.825	6	1.4	6	8.525	6	3.25	6	4.05	6	531	3	
223	07/23/92	2.1	J	1.5	U	7.5	U	7.2		3.5		200	()	ASMGW92C
223	9/92	3.6	UB	1.65	U	4.5	UBP	1	U	5.75	U	199	E	ESE, 1/93
223	11/92	1.75	UBR	0.05	U	15	UBB	1.55	U	7.5	UBP	510	E	ESE, 4/93
223	02/08/93	4.8		1.1	U	4.6	U	3.9	U	3.3	U			ASMGW93B
223	05/12/93	3.2		0.08		6.75	U	2.6	U	3	UR			ASMGW93D
223	07/13/93	3.8		1.3	U	7.6	U	2.6	U	6	U			ASMGW93E
	MEDIAN	3.4	6	1.2	6	7.125	6	2.6	6	4.625	6	200	3	
224	07/22/92	0.5	UJ	1.5	U	7.5	U	123		1.5	U	17.4	()	ASMGW92C
224	9/92	1.55	UB	1.65	UJD	17.1	UBP	110	JI	5.75	U	224	E	ESE, 1/93
224	11/92	1.9		1.95	U	25.5	UBP	9		3	UBR	13	E	ESE, 4/93
224	02/08/93	0.64	UJ	1.1	U	10	U	5		6.3	U	19	(D)	ASMGW93B
224	05/13/93	1.6	J	0.04		6.75	U	2.6	U	6	UR			ASMGW93D
224	07/14/93	0.85	U	1.3	U	11.7	U	5.3	U	4	U			ASMGW93E
	MEDIAN	1.2	6	1.4	6	10.85	6	7.15	6	4.875	6	18.2	4	
225	07/23/92	13.7	J	1.5	U	7.5	U	145		6.9		91.4	()	ASMGW92C
225	9/92	21.4	JS	1.65	U	15.5	UBP	45	JI	5.75	U	99	E	ESE, 1/93
225	11/92	14.2		1.95	U	17	UBB	38		8.5	UBP	103	E	ESE, 4/93
225	02/10/93	15.3		1.1	U	22.5	U	15		3.3	U			ASMGW93B
225	05/12/93	15.5		0.02	U	6.75	U	9		3	UR			ASMGW93D
225	07/19/93	13		1.3	U	5.9	U	14.7		3.8	UJ			ASMGW93E
	MEDIAN	14.75	6	1.4	6	11.5	6	26.5	6	4.775	6	99	3	
226D	07/23/92	5.1	J	1.5	U	7.5	U	260		1.5	U	31.2	()	ASMGW92C
226D	9/92	9.4	JS	1.65	U	11	UBP	243	JI	5.75	U	29	E	ESE, 1/93
226D	11/92	8.1		1.95	U	14.5	UBP	132		3	UBR		E	ESE, 4/93

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
226D	02/09/93	9.1		1.1	U	4.6	U	135		3.3	U			ASMGW93B
226D	05/12/93	8.7		0.04		6.75	U	155		3	UR			ASMGW93D
226D	07/16/93	6.5	U	1.3	U	6.15	U	169		6.1	U			ASMGW93E
226D	07/16/93	5.95	U	1.3	U	5.9	U	160		7.2	U			ASMGW93E
	MEDIAN	8.1	7	1.3	7	6.75	7	160	7	3.3	7	30.1	2	
227	9/92	52.4		0.15	UB	29.5	UBP	1.5	UB	5.75	U	28	E	ESE, 1/93
227	11/92	47.3		1.95	U	19.5	UBP	1.55	U	6	UBR		E	ESE, 4/93
227	02/09/93	49.2		1.1	U	8.5	U	3.9	U	5	U			ASMGW93B
227	05/14/93	49.3		0.065	U	6.75	U	2.6	U	3	U			ASMGW93D
227	07/22/93	106	J	1.3	U	5.9	U	4.1	U	8.9	U			ASMGW93E
227	07/22/93	125	J	0.11		5.9	U	4.1	U	5.6	U			ASMGW93E
	MEDIAN	50.85	6	0.625	6	7.625	6	3.25	6	5.675	6	28		
228	9/92	6.5	JS	3	UB	12.5	UBP	5.5	UB	5.75	U	86	E	ESE, 1/93
229	9/92	5.1	JS	2	UB	15.5	UBP	8	UB	17		147	E	ESE, 1/93
230	9/92	0.65	UJS	1.65	UJD	26.6	UB	405	JI	26.2		290	E	ESE, 1/93
230	11/92	2	UBR	1.95	U	23.5	UBB	125		7.5	UBP	296	E	ESE, 4/93
230	02/08/93	2.4		1.1	U	4.6	U	57		8		279	(D)	ASMGW93B
230	05/12/93	1.4		0.05		6.75	U	51		3	UR			ASMGW93D
230	07/13/93	1		1.3	U	7.6	U	38.7		3	U			ASMGW93E
	MEDIAN	1.4	5	1.3	5	7.6	5	57	5	7.5	5	290	3	
231	9/92	2.8	JS	2.5	UB	16.5	UBP	35	JI	5.75	U	25	E	ESE, 1/93
231	11/92	0.65	U	1.95	U	27	UBP	13		2.85	U	18	E	ESE, 4/93
231	02/11/93	1.6	UJ	1.1	U	12.5	U	3.9	U	5	U			ASMGW93B
231	02/11/93	1.25	U	1.1	U	12.5	U	3.9	U	5	U			ASMGW93B
231	05/12/93	0.65	U	0.02	U	6.75	U	2.6	U	3	UR			ASMGW93D
231	07/16/93	2.7	U	1.3	U	8.6	U	7		9.55	U			ASMGW93E
	MEDIAN	1.425	6	1.2	6	12.5	6	5.45	6	5	6	21.5	2	
232	9/92	195	JS	2.5	UB	24.5	UBP	47	JI	5.75	U	36	E	ESE, 1/93
232	11/92	160		1.95	U	30	UBR	24		2.85	UBP	41	E	ESE, 4/93
232	02/05/93	128		1.1	U	27	U	8	U	7		29	(D)	ASMGW93B
232	05/17/93	236		0.02	U	6.75	U	2.6	U	8				ASMGW93D
232	07/20/93	262		1.3	U	40.8		6.8		3.8	U			ASMGW93E
	MEDIAN	195	5	1.3	5	27	5	8	5	5.75	5	36	3	
233	9/92	2.05	UB	0.25	UB	931		25		5.75	U	10	E	ESE, 1/93
233	11/92	1.9	UBB	1.95	U	21	UBP	6		5	UBR	20	E	ESE, 4/93
233	02/09/93	1.4	U	1.1	U	16	U	3.9	U	6.5	U			ASMGW93B
233	05/15/93	3.5		0.02	U	6.75	U	2.6	U	3	U			ASMGW93D
233	07/15/93	3.6	UJ	1.3	U	5.9	U	4.1	U	3.8	U			ASMGW93E
	MEDIAN	2.05	5	1.1	5	16	5	4.1	5	5	5	15	2	

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
234D	9/92	1.35	UB	1.65	U	4.5	UBP	2	UB	5.75	U	33	E	ESE, 1/93
234D	11/92	2.15	UBR	1.95	U	15	UBB	1.55	U	4.5	UBP	24	E	ESE, 4/93
234D	02/05/93	1.7		1.1	U	20	U	5	U	3.3	U	29	(D)	ASMGW93B
234D	05/12/93	2.7		0.02	U	6.75	U	2.6	U	3	UR			ASMGW93D
234D	07/14/93	0.85	UJ	1.3	U	6.75	U	2.6	U	3	U			ASMGW93E
	MEDIAN	1.7	5	1.3	5	6.75	5	2.6	5	3.3	5	29	3	
235	09/24/93	2.8		1.9	J	8	U			15800				ASMGW93F
235	09/24/93	2.4		1.9	J	6.75	U			15800				ASMGW93F
	MEDIAN	2.6	2	1.9	2	7.375	2		0	15800	2		0	
304	1/8/85	3		0.35		15.5		NA		13.5		151		Stiller, 1985
309	1/4/85	12		2.5		15.5		NA		110		42		Stiller, 1985
311	1/4/85	2.65		0.25		15.5		NA		13.5		362		Stiller, 1985
312	1/16/85	7		0.35		15.5		NA		13.5		215		Stiller, 1985
314	1/8/85	3.05		0.3		15.5		NA		140		304		Stiller, 1985
318	1/4/85	2.65		0.25		15.5		NA		160		258		Stiller, 1985
319	1/16/85	3.3		0.4		160		NA		53		87		Stiller, 1985
321	1/17/85	1.75		0.25		59		NA		100		76		Stiller, 1985
328	1/4/85	2.65		0.25		15.5		NA		7U		0.25		Stiller, 1985
329	1/17/85	1.75		0.4		84		NA		13.5		45		Stiller, 1985
336	1/4/85	2.65		0.25		830		NA		140		100		Stiller, 1985
405	1/7/85	2.65		0.25		15.5		NA		13.5		482		Stiller, 1985
408	1/7/85	2.65		0.25		15.5		NA		13.5		58		Stiller, 1985
411	1/7/85	2.65		0.25		290		NA		90		180		Stiller, 1985
501	1/8/85	2.25U		0.3		15.5		NA		280		62		Stiller, 1985
A1BR2	7/89	3820		2		10		5.4		4.7		522		PTI R/I F/S, 1991
A1BR2	9/91	5080		1		5.5		0.5		1		559		ESE 1/92
A1BR2	9/91	5150		1		5.5		0.5		1		560		ESE 1/92
A1BR2	9/91	5150		1		5.5		0.5		1		551		ESE 1/92
A1-BR2	02/20/92	5190		5.8		2	U	0.5	U	2.5				ASMGW92B
A1-BR2	06/03/92	5020		1.5	U	13.5	U	1.5	U	2	U	518	()	ASMGW92C

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
A1BR-2	9/92	4450		0.15	UB	12.5	UBP	1	UB	5.75	U	491	E	ESE, 1/93
A1BR-2	11/92	4780		1.95	U	18.5	UBR	1.55	U	2.85	UBP	515	E	ESE, 4/93
A1-BR2	02/02/93	5080		1.1	U	4.6	U	1.95	U	6.3	U	466	(D)	ASMGW93B
A1-BR2	05/19/93	8470		0.15		7	U	1.3	U	9	U			ASMGW93D
A1-BR2	07/23/93	7140		3.3	U	6.25	U	2.05	U	7.6	U			ASMGW93E
	MEDIAN	5080	11	1.1	11	6.25	11	1.3	11	2.85	11	520	8	
A1BR3	7/89	25.4		2		10		108		11		111		PTI R/I F/S, 1991
A1-BR3	06/03/92	24.5		1.5	U	13.5	U	4.1		2	U	99.4	()	ASMGW92C
A1BR-3	9/92	18.1		0.15	UB	22.5	UBP	2	UB	5.75	U	91	E	ESE, 1/93
A1BR-3	11/92	14.3		1.95	U	13.5	UBR	1.55	U	2.85	UBP	96	E	ESE, 4/93
A1-BR3	02/02/93	7.8	UJ	1.1	U	4.6	U	1.95	U	6.3	U	80	(D)	ASMGW93B
A1-BR3	02/02/93	7.95	U	1.1	U	4.6	U	2	U	6.3	U			ASMGW93B
A1-BR3	05/19/93	7.8	U	0.055	U	6.75	U	3.5	U	6	U			ASMGW93D
A1-BR3	07/22/93	33.4	J	1.3	U	5.9	U	2.05	U	7.6	U			ASMGW93E
	MEDIAN	16.2	8	1.2	8	8.375	8	2.025	8	6.15	8	96	5	
A2BR	7/89	900		2		10		2.6		2		297		PTI R/I F/S, 1991
A2BR	9/91	854		1		6		0.5		1		241		ESE 1/92
A2-BR	02/18/92	979	J	1.5	U	5.7		0.5	U	2	U			ASMGW92B
A2-BR	06/01/92	1150		1.5	U	13.5	U	1.5	U	4.1	U	231	()	ASMGW92C
A2BR	9/92	843		0.2	UB	23	UBP	1	UB	5.75	U	182	E	ESE, 1/93
A2BR	11/92	1030		1.95	U	11	UBR	1.55	U	2.85	UBP	173	E	ESE, 4/93
A2-BR	02/04/93	1200		1.1	U	4.6	U	1.95	U	7		198	(D)	ASMGW93B
A2-BR	05/18/93	2410		0.055	U	6.75	U	1.3	U	6	U			ASMGW93D
A2-BR	07/20/93	1340		0.08	U	5.9	U	2.05	U	7.6	U			ASMGW93E
	MEDIAN	1030	9	1.1	9	6.75	9	1.5	9	4.1	9	214.5	6	
AN-001	12/17/85	2.5		1		NA		49		63		18		Tetra Tech #4, 1986
AN-002	12/17/85	2.5		1		NA		43		277		34		Tetra Tech #4, 1986
AN-003	12/17/85	2.5		2		NA		50		118		19		Tetra Tech #4, 1986
AN-004	12/17/85	2.5		1		NA		50		176		18		Tetra Tech #4, 1986
AN-005	12/17/85	2.5		1		NA		46		20		18		Tetra Tech #4, 1986
B4BR	7/89	4.2		3.6		291		8.4		60		418		PTI R/I F/S, 1991
B4-BR	02/18/92	1410	J	45.6		5.45	U	22.5		545				ASMGW92B
B4-BR	02/18/92	1330	J	44.7		7.8	U	22.2		515				ASMGW92B
B4-BR	06/01/92	1640		39.8		13.5	U	20.6		598				ASMGW92C
B4-BR	06/01/92	1660		39.1		13.5	U	22.4		611		532	()	ASMGW92C
B4BR	9/92	1210		22.5	UB	26.5	UBP	22		522		438	E	ESE, 1/93
B4BR	11/92	1220		38		15	UBR	24		525		476	E	ESE, 4/93
B4-BR	02/03/93	1320		42		14		28		412		451	(D)	ASMGW93B
B4-BR	05/18/93	1190		56.3		8	U	26		753				ASMGW93D

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
B4-BR	07/16/93	1130		49.1		5.9	U	30.8		652				ASMGW93E
	MEDIAN	1270	10	40.9	10	13.5	10	22.45	10	535	10	451	5	
C-1	11/25/91	2.9		1.4	U	34.1		148		29.3		205	()	SBCGW91C
C-1	10/27/92	4.1	A	0.05	U	23.5	U	2	U	30	U			SBCGW92B
	MEDIAN	3.5	2	0.725	2	28.8	2	75	2	29.65	2	205	1	
C-2	07/31/91	1.5		1.5						179	UJ			SBCGW91A
C-2	10/27/92	2.4	A	1.7		71.5	U	80		258				SBCGW92B
	MEDIAN	1.95	2	1.6	2	71.5	1	80	1	218.5	2		0	
C-3	11/23/91	0.8	U	10.4						2110		126	()	SBCGW91C
C-3	10/27/92	1.9	A	9.2		66	U	711		1240				SBCGW92B
	MEDIAN	1.35	2	9.8	2	66	1	711	1	1675	2	126	1	
C-4	11/25/91	6.1		25.7						9250		161	()	SBCGW91C
C-4	10/27/92	8.3	A	29.2		6040		4740		8190				SBCGW92B
C-4S	07/30/91	11.2		0.4						6200	UJ			SBCGW91A
C-4S	10/27/92	16.4	A	0.45		8320		5290		7390				SBCGW92B
	MEDIAN	9.75	4	13.075	4	7180	2	5015	2	7790	4	161	1	
C-5	08/01/91	2.4		1.3						52.7	UJ			SBCGW91A
C-5	10/27/92	3.6	A	0.16		528		4830		68	U			SBCGW92B
	MEDIAN	3	2	0.73	2	528	1	4830	1	60.35	2		0	
C-6	11/25/91	8.7		1.4	U					308		137	()	SBCGW91C
C-6	10/27/92	12	A	0.05	U	4220		1310		123				SBCGW92B
	MEDIAN	10.35	2	0.725	2	4220	1	1310	1	215.5	2	137	1	
C-24	10/27/92	4.9	A	4.7		48.5	U	4880		271				SBCGW92B
C-25	10/27/92	3	A	2.7		31	U	1850		247				SBCGW92B
C-26	10/27/92	6	A	0.61		102.5	U	1040		42	U			SBCGW92B
C-27	10/27/92	8.1	A	0.39		45	U	1000		105				SBCGW92B
C-28	10/27/92	12.4	JA	0.48		1820		2040		85				SBCGW92B
C2AL	7/89	1810		2		12500		6880		7100		840		PTI R/I F/S, 1991
C2AL	9/91	2440		6.2		13400		7850		8650		781		ESE 1/92
C2-AL	02/19/92	2440		6		13300		7980		8470				ASMGW92B
C2-AL	06/02/92	2370		1.5	U	11100		7210		8830		826	()	ASMGW92C
C2AL	9/92	2010		0.35	UB	11800		6960		7740		786	E	ESE, 1/93
C2AL	11/92	2120		1.95	U	10900		6870		8330		774	E	ESE, 4/93
C2-AL	02/03/93	2380		1.1	U	13700		8710		9690		755	(D)	ASMGW93B
C2-AL	05/18/93	2450		0.5		12900		8120		8390				ASMGW93D

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
C2-AL	07/22/93	2240		0.31	J	12100		7390		8070				ASMGW93E
	MEDIAN	2370	9	1.5	9	12500	9	7390	9	8390	9	783.5	6	
C2BR	7/89	845		2		7650		3940		3330		924		PTI R/I F/S, 1991
C2-BR	06/02/92	1240		1.5	U	6430		3340		3500		1037	()	ASMGW92C
C2BR	9/92	1000		0.1	UB	8060		3820		3650		995	E	ESE, 1/93
C2BR	11/92	979		1.95	U	6210		2970		2920		1020	E	ESE, 4/93
C2-BR	02/03/93	1240		1.1	U	8660		4280		4040		1010	(D)	ASMGW93B
C2-BR	05/18/93	1200		0.055	U	8220		3950		3510				ASMGW93D
C2-BR	07/22/93	1150		1.3	U	7580		3720		3480				ASMGW93E
	MEDIAN	1150	7	1.3	7	7650	7	3820	7	3500	7	1010	5	
CFR-3	9/92	1	UB	1.65	U	792		3740		5.75	U	195	E	ESE, 1/93
CFR-3	11/92	1.65	UBB	1.95	U	790		3400		5	UBR	192	E	ESE, 4/93
CFR-3	02/05/93	0.65	U	1.1	U	1020		3280		6.3	U	201	(D)	ASMGW93B
CFR-3	05/17/93	0.65	U	0.055	U	884		2590		6	U			ASMGW93D
CFR-3	07/19/93	0.8	U	1.3	U	819		2010		7.6	UJ			ASMGW93E
	MEDIAN	0.8	5	1.3	5	819	5	3280	5	6	5	195	3	
D2BR	7/89	20.1		2		188		1080		10.3		806		PTI R/I F/S, 1991
D3AL	9/91	38.4		1		3		0.5		1		1210		ESE 1/92
D3AL1	7/89	81.2		3.45		54		25.3		25.3		1210		PTI R/I F/S, 1991
D3-AL1	09/17/91	38.4		1	U	10.5	U	0.5	U	2	U			ASMGW91C
D3-AL1	02/19/92	66.5		4.1		3.85	U	0.5	U	5.1	UJ			ASMGW92B
D3-AL1	06/01/92	66.5		5.1		13.5	U	1.5	U	2	U	1290	()	ASMGW92C
D3AL-1	9/92	68		0.25	UB	19.5	UBP	3.5	UB	14		1230	E	ESE, 1/93
D3AL-1	11/92	45.1		1.95	U	20	UBR	4		9.5	UBR	1130	E	ESE, 4/93
D3-AL1	02/03/93	53.2		1.1	U	26		7		16		1110	(D)	ASMGW93B
D3-AL1	05/20/93	60.9		0.05	U	9.5	U	5.5	U	21	U			ASMGW93D
D3-AL1	07/22/93	101	J	1.3	U	48.75	U	8.8		21.8	U			ASMGW93E
	MEDIAN	66.5	9	1.3	9	19.5	9	4	9	14	9	1210	5	
D3AL3	7/89	186		2		10		2		2		768		PTI R/I F/S, 1991
DW-1	07/28/93	0.6	U	0.02	U					11				ASMGW93J
DW-2	07/28/93	1.9		0.02	U					7.6	U			ASMGW93J
DW-3	07/28/93	1		0.02	U					27				ASMGW93J
DW-4	07/28/93	0.5	U	0.02	U					7.6	U			ASMGW93J
DW-5	07/28/93	7.9		0.02	U					8				ASMGW93J
DW-301	01/04/85	10		0	U	15	U			40000		20	(D)	SBCGW85A

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
DW-304	01/08/85	5	U	0	U	15	U			30	U	151	(D)	SBCGW85A
DW-309	01/04/85	5		5	U	15	U			110		42	(D)	SBCGW85A
DW-311A	01/04/85	5	U	0	U	15	U			30	U	362	(D)	SBCGW85A
DW-312	01/08/85	5		0	U	15	U			30	U	215	(D)	SBCGW85A
DW-314	01/08/85	5	U	0	U	15	U			140		304	(D)	SBCGW85A
DW-318	01/04/85	5	U	0	U	15	U			160		258	(D)	SBCGW85A
DW-319	01/16/85	5	U	0	U	160				50		87	(D)	SBCGW85A
DW-321	01/17/85	0	U	0	U	60				100		76	(D)	SBCGW85A
DW-328	01/04/85	5	U	0	U	15	U			30	U	0.5	U(D)	SBCGW85A
DW-329	01/17/85	0	U	0	U	80				30	U	45	(D)	SBCGW85A
DW-336	01/04/85	5	U	0	U	830				140		100	(D)	SBCGW85A
E2AL	9/91	5.3		1		5.5		12.4		1		275		ESE 1/92
E2AL	9/91	NA		NA		NA		NA		NA		275		ESE 1/92
E2AL	11/92	0.65	U	1.95	U	17.5	UBP	4		5	UBR	185	E	ESE, 4/93
	MEDIAN	2.975	2	1.475	2	11.5	2	8.2	2	3	2	275	3	
E2-AL1	09/18/91	5.3		1	U	5.5	U	12.4		2	U			ASMGW91C
E2-AL1	02/21/92	0.5	U	0.5	U	3	U	1	U	2.5				ASMGW92B
E2-AL1	06/02/92	0.5		1.5	U	13.5	U	6.1		2	U	203	()	ASMGW92C
E2AL1	9/92	1.55	UB	0.25	UB	25.5	UBP	23		5.75	U	196	E	ESE, 1/93
E2-AL1	02/09/93	1.9	UJ	1.1	U	14	U	1.95	U	15	U			ASMGW93B
E2-AL1	05/19/93	0.49	U	0.02	U	16.5	U	31		25	U			ASMGW93D
E2-AL1	07/16/93	4	UJ	1.3	U	11.05	U	2.05	U	16.3	U			ASMGW93E
E2AL1	7/89	4.2		2		161		419		21 6		NA		PTI R/I F/S, 1991
	MEDIAN	1.725	8	1.05	8	13.75	8	9.25	8	10 375	8	199.5	2	
E2AL2	7/89	5.4		2		10		41.9		10.5		40.3		PTI R/I F/S, 1991
F2BR	7/89	1		2		10		2.3		4.3				PTI R/I F/S, 1991
F2BR	9/91	14.6		1		5.5		1.9		1		85.6		ESE 1/92
F2-BR	02/19/92	0.5	U	1.5	U	2	U	0.5	U	2	U			ASMGW92B
F2-BR	06/02/92	1.4	J	1.5	U	13.5	U	1.5	U	2	U	79.8	()	ASMGW92C
F2BR	9/92	1.45	UB	0.15	UB	15	UBP	1	U	5.75	U	96	E	ESE, 1/93
F2BR	11/92	0.65	U	1.95	U	21	UBP	1.55	U	6	UBR	80	E	ESE, 4/93
F2-BR	02/11/93	1.85	U	1.1	U	8.5	U	1.95	U	13	U			ASMGW93B

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
F2-BR	05/15/93	0.65	UR	0.02	U	6.75	U	1.3	U	6	U			ASMGW93D
F2-BR	07/16/93	2.7	U	1.3	U	8.6	U	2.01	U	18.2	U			ASMGW93E
	MEDIAN	1.4	9	1.3	9	8.6	9	1.55	9	5.75	9	82.8	4	
FH-1	12/90	2.9	JL	2.15		564		6.4	Q	13.8	Q	25.5		ESE 6/91
FH-1	12/90	3.3	JL	2.15		47.8	Q	2.9	Q	12.4	Q	24.3		ESE 6/91
FH-1	12/90	4.2	JL	2.15		71.1	Q	0.9		11.7	Q	25.6		ESE 6/91
FH-1	3/91	1		1.5		12.5		1		5		23.9		ESE 6/91
FH-1	6/91	5.8		1		6		1.5		1		20		ESE 9/91
FH-1	9/91	1		1		12.6		0.5		6.9		22.7		ESE 1/92
	MEDIAN	3.1	6	1.825	6	30.2	6	1.25	6	9.3	6	24.1	6	
FH-2	12/91	10.2		1		5.5		7.1		1		37.3		ESE 3/92
FH-2	02/13/92	16.2		0.5	U	3	UJ	25.3		2.9				ASMGW92B
FH-2	05/27/92	7.9	J	1.5	U	13.5	U	1.5	U	2	U	8.4	()	ASMGW92C
FH-2	11/92	15		1.95	U	23	UBP	46		2.85	U	106	E	ESE, 4/93
FH-2	02/07/93	13.3		0.02	U	5	U	44		7		97	(D)	ASMGW93B
FH-2	02/07/93			0.055	U					0				ASMGW93B
FH-2	05/10/93	16.5		0.02	U	13	U	41		7				ASMGW93D
FH-2	07/12/93	17.4		1.3	U	5.9	U	39.7		9.7				ASMGW93E
	MEDIAN	15	7	0.75	8	5.9	7	39.7	7	2.875	8	67.15	4	
GW-01	12/29/87	2.8	B	2.5	U	7.5	UJ	1.5	UJ	13	UJ	30	(D)	SBCGW87A
GW-01	05/19/88	2.6	B	2.5	U	28	U	3.5	U	20	J	26	(D)	SBCGW87A
	MEDIAN	2.7	2	2.5	2	17.75	2	2.5	2	16.5	2	28	2	
GW-02D	05/23/88	1	U	7.3		409		4460		18.1	BJ	554	(D)	SBCGW87A
GW-02S	05/23/88	197		10.7		76500		26400		51.7		1620	(D)	SBCGW87A
GW-02S	01/14/88	57		6		72400		26800		195		1100	(D)	SBCGW87A
GW-02S	01/14/88	72		5		80900		31600		226		870	(D)	SBCGW87A
	MEDIAN	64.5	4	6.65	4	74450	4	26600	4	123.35	4	985	4	
GW-03D	05/23/88	1	U	7.2		28	U	97.7		16.1	BJ	1150	(D)	SBCGW87A
GW-03D	01/15/88	1.5	U	8		35	B	58		43		1010	(D)	SBCGW87A
GW-03D	01/15/88	1.5	U	2.5	U	18	B	52		60		1200	(D)	SBCGW87A
GW-03S	05/23/88	1	U	8.3		163		335		16.3	BJ	1280	(D)	SBCGW87A
GW-03S	01/18/88	1	U	2.5	U	146	J	309		18	B	1020	(D)	SBCGW87A
	MEDIAN	1	5	7.2	5	35	5	97.7	5	18	5	1150	2	
GW-04	05/24/88	1	U	2.5	U	28	U	3.5	U	27.2		398	(D)	SBCGW87A
GW-04	01/19/88	1	U	2.5	U	7.5	U	3	BJ	16	B	300	(D)	SBCGW87A
	MEDIAN	1	2	2.5	2	17.75	2	3.25	2	21.6	2	349	2	
GW-05	05/24/88	1	U	12.7		1020		6990		149		1180	(D)	SBCGW87A
GW-05	01/19/88	4.5	B	2.5	U	965	J	6890		100		950	(D)	SBCGW87A
	MEDIAN	2.75	2	7.6	2	992.5	2	6940	2	124.5	2	1065	2	

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
GW-06D	12/28/87	2.6	B	7		17	B	9	B	13	UJ	68	(D)	SBCGW87A
GW-06D	05/19/88	3	B	2.5	U	28	U	3.5	U	4.7	BJ	22.6	(D)	SBCGW87A
GW-06S	12/28/87	4.7	B	2.5	U	7.5	U	8	B	13	UJ	47	(D)	SBCGW87A
GW-06S	12/28/87	5.9	B	5		7.5	U	6	B	13	UJ	44	(D)	SBCGW87A
GW-06S	05/19/88	4.9	B	2.5	U	28	U	3.5	U	240		63.3	(D)	SBCGW87A
	MEDIAN	4.7	5	2.5	5	17	5	6	5	13	5	47	5	
GW-07D	05/19/88	1	U	5.2		28	U	3.5	U	9.3	BJ	200	(D)	SBCGW87A
GW-07D	01/15/88	1.5	U	2.5	U	19	B	26		38		210	(D)	SBCGW87A
GW-07S	05/19/88	28.2		2.5	U	28	U	116		32.3		139	(D)	SBCGW87A
GW-07S	05/19/88	28.1		2.5	U	28	U	114		22.5	J	142	(D)	SBCGW87A
GW-07S	01/15/88	41		2.5		577		592		60		60	J(D)	SBCGW87A
	MEDIAN	28.1	5	2.5	5	28	5	114	5	32.3	5	142	5	
GW-08D	12/29/87	1	U	2.5		68	BJ	15	J	36	J	92	(D)	SBCGW87A
GW-08D	12/29/87	1	U	7		26	BJ	15	J	41	J	94	(D)	SBCGW87A
GW-08D	05/19/88	1	U	2.5	U	28	U	3.5	U	6.2	BJ	101	(D)	SBCGW87A
GW-08S	12/29/87	1	U	2.5	U	68	BJ	175		22	J	420	(D)	SBCGW87A
GW-08S	05/19/88	1	U	2.5	U	28	U	45		12.7	BJ	461	(D)	SBCGW87A
	MEDIAN	1	5	2.5	5	28	5	15	5	22	5	101	5	
GW-09	12/28/87	6.8	B	5		7.5	U	22		13	UJ	63	(D)	SBCGW87A
GW-09	05/19/88	6.7	B	2 5	U	28	U	7.1	B	21.2	J	71.2	(D)	SBCGW87A
	MEDIAN	6.75	2	3.75	2	17.75	2	14.55	2	17.1	2	67.1	2	
GW-10D	05/20/88	1	U	5.9		28	U	2150		41.7	J	1050	(D)	SBCGW87A
GW-10D	01/13/88	1.5	U	5		46	B	1340		106		1010	(D)	SBCGW87A
GW-10D	01/13/88	1.5	U	2.5	U	7.5	U	1870		116		1100	(D)	SBCGW87A
GW-10S	05/20/88	16.8		2.5	U	2530		10800		330		470	(D)	SBCGW87A
GW-10S	01/14/88	14		2.5	U	100		9990		250		710	(D)	SBCGW87A
	MEDIAN	1.5	5	2.5	5	46	5	2150	5	116	5	1010	5	
GW-11D	05/20/88	4.1	B	2.5	U	2630		15700		104		687	(D)	SBCGW87A
GW-11D	05/20/88	2.8	B	2.5	U	1630		15900		64.8		660	(D)	SBCGW87A
GW-11D	01/14/88	1.5	U	5		395		18200		281		720	(D)	SBCGW87A
GW-11S	05/20/88	105		2.5	U	52500		13200		1090		1006	(D)	SBCGW87A
GW-11S	01/14/88	33		6		29400		18100		747		790	(D)	SBCGW87A
	MEDIAN	4.1	5	2.5	5	2630	5	15900	5	281	5	720	5	
GW-12D	05/24/88	1	U	2.5	U	28	U	35.2		12.2	BJ	106	(D)	SBCGW87A
GW-12D	05/24/88	1	U	2.5	U	28	U	22.4		8	B	101	(D)	SBCGW87A
GW-12D	01/18/88	1	U	2.5	U	7.8	U	20		18	B	55	(D)	SBCGW87A
GW-12S	05/24/88	1	U	6.8		28	U	8180		253		689	(D)	SBCGW87A
GW-12S	01/18/88	2.4	B	9		49	BJ	7620		233		250	(D)	SBCGW87A
	MEDIAN	1	5	2.5	5	28	5	35.2	5	18	5	106	5	
GW-13D	05/23/88	1	U	2.5	U	28	U	13.2	B	10.6	BJ	723	(D)	SBCGW87A

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
GW-13D	01/18/88	1	U	2.5	U	7.5	U	18		24		760	(D)	SBCGW87A
GW-13S	05/23/88	61.2		11.5		31600		16200		29.9	J	1490	(D)	SBCGW87A
GW-13S	01/18/88	41		2.5	U	23300		16600		29		1300	(D)	SBCGW87A
	MEDIAN	21	4	2.5	4	11664	4	8109	4	26.5	4	1030	4	
GW-14D	05/23/88	1	U	2.5	U	28	U	1210		10.1	BJ	554	(D)	SBCGW87A
GW-14D	05/23/88	1	U	6.5		28	U	1240		17.1	B	565	(D)	SBCGW87A
GW-14D	01/18/88	1	U	5		36	B	1400		29		350	(D)	SBCGW87A
GW-14D	01/18/88	1	U	2.5	U	40	B	1450		26		470	(D)	SBCGW87A
GW-14S	05/23/88	3.6	B	2.5	U	28	U	352		35.5		325	(D)	SBCGW87A
GW-14S	01/18/88	7.1	B	2.5	U	45	BJ	387		40		310	(D)	SBCGW87A
	MEDIAN	1	6	2.5	6	32	6	1225	6	27.5	6	410	6	
GW-15D	05/20/88	1	U	2.5	U	28	U	10.2	B	37.1	J	606	J(D)	SBCGW87A
GW-15D	01/20/88	1	U	2.5	U	17	B	22		26		790	(D)	SBCGW87A
GW-15D	01/20/88	1	U	2.5	U	7.5	U	37	J	28	J	720	(D)	SBCGW87A
GW-15S	05/20/88	6.5	B	2.5	U	259		1490		36.1	J	128	J(D)	SBCGW87A
GW-15S	01/20/88	6.7	B	2.5	U	25	BJ	738		27	J	100	(D)	SBCGW87A
	MEDIAN	1	5	2.5	5	25	5	37	5	28	5	606	5	
GW-16D	05/20/88	1	U	2.5	U	70.1	B	8550		6.3	BJ	1060	J(D)	SBCGW87A
GW-16D	01/19/88	1	U	2.5	U	19	BJ	8320		17	B	960	(D)	SBCGW87A
GW-16D	01/19/88	1	U	2.5	U	36	BJ	7900		40		1020	(D)	SBCGW87A
GW-16S	05/20/88	1	U	2.5	U	573		10100		33.5	J	1130	J(D)	SBCGW87A
GW-16S	01/19/88	1	U	2.5	U	128	J	5800		13	U	1100	(D)	SBCGW87A
	MEDIAN	1	5	2.5	5	70.1	5	8320	5	17	5	1060	5	
GW-17	05/24/88	1	U	11.7		2360		14000		1180		1110	J(D)	SBCGW87A
GW-17	01/25/88	6.5	B	2.5	U	4560	J	16300		1380		1100	(D)	SBCGW87A
GW-17	01/25/88	4.9	B	2.5	U	4000	J	14500		1250		980	(D)	SBCGW87A
	MEDIAN	4.9	3	2.5	3	4000	3	14500	3	1250	3	1100	3	
GW-18D	05/24/88	1	U	5.8		174		3320		69.2		335	(D)	SBCGW87A
GW-18D	01/20/88	1	U	2.5	U	27	BJ	3630		29	J	250	(D)	SBCGW87A
GW-18S	05/24/88	2.9	B	10.9		28	U	29.5		18.8	BJ	420	J(D)	SBCGW87A
GW-18S	01/20/88	4	B	2.5	U	40	BJ	91		30	J	510	(D)	SBCGW87A
	MEDIAN	1.95	4	4.15	4	34	4	1705.5	4	29.5	4	377.5	4	
GW-19D	05/24/88	1	U	8.4		28	U	82.2		6.2	BJ	484	J(D)	SBCGW87A
GW-19D	01/26/88	1	U	2.5	U	7.5	U	97		27		460	(D)	SBCGW87A
GW-19S	05/24/88	1	U	7.1		8650		10700		16.6	BJ	1030	J(D)	SBCGW87A
GW-19S	01/26/88	1	U	5		3630	J	11600		48		980	(D)	SBCGW87A
	MEDIAN	1	4	6.05	4	1829	4	5398.5	4	21.8	4	732	4	
LF-4	12/90	6.5		4.3		36.1		5.3		385		40.6		ESE 6/91
LF-4	3/91	4.7		1.5		12.5		1		413		35.5		ESE 6/91
LF-4	6/91	19.9		1		6		1.5		112		64.2		ESE 9/91

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
LF-4	9/91	9.4		1		65.8		2.8		119		50.4		ESE 1/92
LF-4	12/91	5.8		3.4		5.5		0.5		240		37.7		ESE 3/92
LF-4	11/16/90	0.105	U	0.55	U	53.7		3.4	B	378.6				ASMGW90A
LF-4	12/17/90	0.9	UJ	2.15	U	18.05	U	5.3	B	385				ASMGW90B
LF-4	03/29/91	1	U	2.5	U	12.5	U	1	U	413				ASMGW91A
LF-4	02/17/92	3.7	J	1.5	U	4.85	U	1.5		248				ASMGW92B
LF-4	05/29/92	4.6	J	1.5	U	13.5	U	1.5	U	347		29.5	()	ASMGW92C
LF4	9/92	6.1		3	UB	22.5	UBP	11		294		31	E	ESE, 1/93
LF-4	11/92	3.5	UBB	1.95	U	13.5	UBP	1.55	U	346		30	E	ESE, 4/93
LF-4	02/04/93	7.9		2.8		11.5		1.95	U	509		115	(D)	ASMGW93B
LF-4	02/04/93			2.8						0				ASMGW93B
LF-4	05/17/93	5.3		2		6.75	U	1.3	U	386				ASMGW93D
LF-4	07/19/93	9.2		1.3	U	5.9	U	2.05	U	264				ASMGW93E
	MEDIAN	5.3	15	1.725	16	12.5	15	1.55	15	346.5	16	37.7	9	
MBMG 44	4/4/80	NA		NA		NA		NA		NA		666		MBMG
MBMG 63	4/16/80	NA		NA		NA		NA		NA		685		MBMG
MBMG 1195	10/24/85	1.1		1		4		NA		130		39.4		MBMG
MBMG 2670SP	10/8/80	NA		1		1		NA		2		74.3		MBMG
MBMG2673	10/9/80	NA		1		9		NA		34		18.3		MBMG
MBMG 2678	10/9/80	NA		1		10		NA		190		113		MBMG
MBMG 2679	10/9/80	NA		1		10		NA		6		15		MBMG
MBMG 2681	10/9/80	14.9		NA		11		NA		22		87.7		MBMG
MBMG 2682	10/8/80	0.3		1B		1		NA		16		19.8		MBMG
MBMG 2702	10/10/80	NA		4		1		NA		2		590		MBMG
MC1	12/5/85	5		1		NA		NA		150		NA		Tetra Tech #4, 1986
MC2	12/5/85	2.5		2.5		516		56		402		273		Tetra Tech #4, 1986
MC3	12/5/85	5		1		NA		NA		50		NA		Tetra Tech #4, 1986
MC4	12/5/85	5		1		NA		NA		110		NA		Tetra Tech #4, 1986
MC5	12/5/85	11		2		NA		NA		1600		NA		Tetra Tech #4, 1986
MC6	12/5/85	2.5		1		NA		NA		130		NA		Tetra Tech #4, 1986

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WELL NUMBER	DATE	As		Cd		Fe		Mn		Zn		SO4		REFERENCE
		(ug/L)	n	(ug/L)	n	(ug/L)	n	(ug/L)	n	(ug/L)	n	(mg/L)	n	
MC7	12/5/85	5		1		NA		NA		1850		NA		Tetra Tech #4, 1986
MC8	12/5/85	5		0.5		NA		NA		180		NA		Tetra Tech #4, 1986
MC9	12/5/85	5		0.5		NA		NA		40		NA		Tetra Tech #4, 1986
MC10	12/5/85	2.5		1		NA		NA		20		NA		Tetra Tech #4, 1986
MC11	12/5/85	5		0.5		NA		NA		130		NA		Tetra Tech #4, 1986
MC12	12/5/85	10		0.5		NA		NA		20		NA		Tetra Tech #4, 1986
MC13	12/5/85	20		1		NA		NA		200		NA		Tetra Tech #4, 1986
MC14	12/5/85	2.5		6		NA		NA		20		NA		Tetra Tech #4, 1986
MC15	12/5/85	30		1		NA		NA		70		NA		Tetra Tech #4, 1986
MC16	12/5/85	13		0.5		NA		NA		20		NA		Tetra Tech #4, 1986
MC17	12/5/85	20		0.5		NA		NA		30		NA		Tetra Tech #4, 1986
MC18	12/5/85	5		6		NA		NA		2700		NA		Tetra Tech #4, 1986
MC19	12/5/85	5		2		NA		NA		4400		NA		Tetra Tech #4, 1986
MC20	12/17/85	2.5		1		13		43		40		23		Tetra Tech #4, 1986
MC21	12/17/85	2.5		1		14		52		76		16		Tetra Tech #4, 1986
MC22	12/17/85	2.5		1		18		52		24		27		Tetra Tech #4, 1986
MC23	12/17/85	2.5		1		88		42		21		30		Tetra Tech #4, 1986
MW-1	7/23/87	6B		2.5		10U		210		40		56		HILL 2/91
MW-1A	7/23/87	8B		2.5		10U		320		40		181		HILL 2/91
MW-2	7/23/87	6B		5		820		170		20		185		HILL 2/91
MW-3	7/23/87	12		6		250		1080		110		62		HILL 2/91
NGP-1	09/24/93	167		0.03	UJ	19.6	U	0		23.6				ASMGW93F
OD-1S	07/27/93	20.9		0.08	U	10.4	U	4.1	U	3.8	U			ASMGW93F
OD-2S	07/27/93	6.6	J	0.24		11300		623		64				ASMGW93F
OD-2S	07/27/93	5.8	J	0.28		11200		620		64.1				ASMGW93F

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
OD-3S	07/27/93	0.85	U	0.26		11.7	U	4.1	U	3.8	U			ASMGW93F
	MEDIAN	6.2	4	0.25	4	5605.85	4	312.05	4	33.9	4		0	
OP-004	12/17/85	2.5		1		22		62		15		3.7		Tetra Tech #4, 1986
OP-005	12/17/85	2.5		1		27		68		295		3.7		Tetra Tech #4, 1986
OP-006	12/17/85	2.5		1		61		63		26		32		Tetra Tech #4, 1986
SA-1	08/10/93	84.6		0.185	U	80.5	U	322		8				ASMGW93G
SA-1	08/10/93	24		0.05	U	9.68		28.5		663	R			ASMGW93G
SA-2	08/10/93	13		0.17		64.1		104		8030	R			ASMGW93G
SA-3	08/11/93	7		3.71		1.95	U	342		3730	R			ASMGW93G
SA-4	08/10/93	7.4		0.39		1.95	U	259		9350	R			ASMGW93G
SA-5	08/30/93	245		0.15	U	36.1	U	66.6		3.8	U			ASMGW93G
SA-5	08/30/93	206		0.15	U	38.9	U	80.4		285				ASMGW93G
SA-6	08/30/93	80.1		0.115	U	48.6	U	107		3.8	U			ASMGW93G
	MEDIAN	52.05	8	0.16	8	37.5	8	105.5	8	474	8		0	
SBL-2	08/25/93	2.5		14		260		46.5		9120	J			ASMGW93G
SBL-5	08/26/93	1.9		51.9		3520		3380		46400				ASMGW93G
	MEDIAN	2.2	2	32.95	2	1890	2	1713.25	2	27760	2		0	
SP1	3/91	19		1.5		12.5		1		5		250		
SP1	6/91	10.6WG		1		6		0.5		1		269		
	MEDIAN	14.8	2	1.25	2	9.25	2	0.75	2	3	2	259.5	2	
SRP-1	09/24/93	21.8		0.135	UJ	6.85	U	0		4.35	U			ASMGW93F
T1A	11/12/90	0.625	U	0.2	U	1.4	U	87		220.5				ASMGW90A
T-1A	12/90	0.9		2.15		31.4		6		218		24		ESE 6/91
T-1A	3/91	1		1.5		12.5		1		235		26.2		ESE 6/91
T-1A	6/91	1		3.3		31.6		14.2		376		100		ESE 9/91
T-1A	12/91	1		0.5		5.5		0.5		181		22.7		ESE 3/92
T-1A	9/91	1		2.3		5.5		1.4		203		23.9		ESE 1/92
T1A	02/14/92	0.5	U	1.4		3	UJ	2	U	180				ASMGW92B
T1A	05/27/92	0.5	UJ	1.5	U	13.5	U	3	U	209		28.6	()	ASMGW92C
T1A	9/92	1.7		3	UB	16	UBP	1	U	171		23	E	ESE, 1/93
T-1A	11/92	0.65	U	1.95	U	19.5	UBP	1.55	U	186		20	E	ESE, 4/93
T1A	02/07/93			1.6				0						ASMGW93B
T1A	05/10/93	0.65	U	2		6.75	U	2.6	U	198				ASMGW93D
T1A	07/12/93	1.7	U	1	U	6.75	U	8		300				ASMGW93E
T1A	02/07/93	0.65	U	1.6		4.6	U	3.9	U	181				ASMGW93B
	MEDIAN	0.9	13	1.6	14	6.75	13	2.3	14	203	13	23.95	8	
T-1B	12/90	0.9		2.15		61.7		6.2		246		24.6		ESE 6/91
T1B	11/12/90	0.625	U	0.9	U	15.3	B	15.3		251.4				ASMGW90A

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
	MEDIAN	0.7625	2	1.525	2	38.5	2	10.75	2	248.7	2	24.6	1	
T-1C	12/90	0.9		2.15		73.8		13.5		269		25.5		ESE 6/91
T1C	11/11/90	0.625	U	0.55	U	13.3	B	18.9		271				ASMGW90A
	MEDIAN	0.7625	2	1.35	2	43.55	2	16.2	2	270	2	25.5	1	
T1D	11/11/90	0.625	U	0.75	U	22.5	B	31.4		47.9				ASMGW90A
T-1D	12/90	0.9		2.15		151		35.6		9.7		66.2		ESE 6/91
T-1D	3/91	1		1.5		45.7		139		2.5		57.7		ESE 6/91
T-1D	6/91	1		1		36.3		88.8		1		66.8		ESE 9/91
T1-D	9/91	1		1		5.5		69.4		1		60.9		ESE 1/92
T1-D	12/91	1		2.2		95.1		58.7		1		60.7		ESE 3/92
T-1D	11/92	0.65	UJG	1.95	U	76	UPB	22		3	UBR	62	E	ESE, 4/93
T-1D (FR)	11/92	0.65	UJG	1.95	U	79.5	UBP	20		4	UBR	60	E	ESE, 4/93
T1D	05/10/93	0.65	U	0.02	U	32	U	11		3	U			ASMGW93D
T1D	02/07/93	0.65	U	0.05	U	33	U	15		3.15	U			ASMGW93B
T1D	07/12/93	1.15	U	1.3	U	43.75	U	10.6		3.8	U			ASMGW93E
T1D	07/12/93	1.45	U	1.3	U	53	U	11.5		3.8	U			ASMGW93E
T1D	02/13/92	0.5	U	0.5	U	19.55	UJ	53.4		1	U			ASMGW92B
T1D	02/07/93			0.05	U			0						ASMGW93B
T1D	05/27/92	0.5	UJ	1.5	U	58.6		29.6		1	U	62.8	()	ASMGW92C
	MEDIAN	0.775	14	1.3	15	44.725	14	29.6	15	3	14	61.45	8	
T1E	11/15/90	0.105	U	4.4	B	9.2	B	10.3		204.4				ASMGW90A
T1E	11/15/90	0.105	U	1.35	U	8.9	B	8.3	B	202.5				ASMGW90A
T1E	11/15/90	0.625	U	0.05	U	9.8	B	5.9	B	200.8				ASMGW90A
T-1E	12/90	0.9		2.15		51.8		2.8		186		25.9		ESE 6/91
	MEDIAN	0.365	4	1.75	4	9.5	4	7.1	4	201.65	4	25.9	1	
T-2	12/90	3JL		2.15		61.8 Q		0.9		15.5 B		17.5		
T2A	11/09/90	0.625	U	0.4	U	26.5	B	10		149.4				ASMGW90A
T-2A	12/90	3		2.15		40.7		2.1		167		31.5		ESE 6/91
T2A	12/12/90	0.9	UJ	2.15	U	40.7	B	2.1	B	167				ASMGW90B
	MEDIAN	0.9	3	2.15	3	40.7	3	2.1	3	167	3	31.5	1	
T2B	11/08/90	0.625	U	0.6	U	16.2	B	12.4		71				ASMGW90A
T-2B	12/90	0.9		2.15		59.8		7.9		61.2		32.3		ESE 6/91
T-2B	3/91	1		1.5		12.5		0.5		51.9		28.8		ESE 6/91
T-2B	6/91	1		1		6		2		12.4		45.9		ESE 9/91
T-2B	9/91	1		1		5.5		1.3		27.7		47.5		ESE 1/92
T-2B	12/91	1		1		5.5		0.5		10.3		34.7		ESE 3/92
T2B	02/13/92	1.2		0.5	U	3	UJ	1	U	34.4	UJ			ASMGW92B
T2B	05/28/92	0.5	UJ	1.5	U	13.5	U	1.5	U	45.9	U	29.2	()	ASMGW92C
T2B	05/28/92	0.5	UJ	1.5	U	13.5	U	1.5	U	47.7	U	29.7	()	ASMGW92C
T2B	9/92	1.8		3	UB	64	UBP	3		26		29	E	ESE, 1/93
T-2B	11/92	1.4		1.95	U	23	UBP	1.55	U	20	UBR	27	E	ESE, 4/93

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
T2B	02/07/93			0.45						0				ASMGW93B
T2B	02/07/93	2.3		0.5		4.6	U	1.95	U	43		27	(D)	ASMGW93B
T2B	05/11/93	1	U	0.46		19	U	1.3	U	35				ASMGW93D
T2B	07/12/93	2.4	U	1.3	U	5.9	U	2.05	U	50.4				ASMGW93E
	MEDIAN	1	14	1	15	13	14	1.525	14	34.4	15	29.45	10	
T-2C	12/90	0.9		2.15		114	Q	1.9	Q	172		31.5		ESE 6/91
T-2C	12/90	2.6		2.15		45	Q	0.9		179		31.7		ESE 6/91
T-2C	12/90	3.2	JL	2.15		47.2	Q	0.9		173		31.7		ESE 6/91
	MEDIAN	2.6	3	2.15	3	47.2	3	0.9	3	173	3	31.7	3	
T2D	11/09/90	0.625	U	0.95	U	2.5	U	1.8	B	99.8	E			ASMGW90A
T-2D	12/90	1.9		2.15		39.8		3.9		113		34.4		ESE 6/91
T-2D	3/91	2		1.5		12.5		1		126		29.2		ESE 6/91
T-2D	6/91	1		1		6		0.5		28.9		35.6		ESE 9/91
T-2D	9/91	1		1		5.5		2.3		68.6		47.3		ESE 1/92
T-2D	12/91	1		1		5.5		1.7		36.1		38.5		ESE 3/92
T2D	02/13/92	1.3		0.5	U	3	UJ	1	U	54.3				ASMGW92B
T2D	05/28/92	1.5	J	1.5	U	13.5	U	1.5	U	80.4		29.4	()	ASMGW92C
T2D	9/92	2.3		2.5	UB	29.5	UBP	1	U	47		31	E	ESE, 1/93
T-2D	11/92	2.3		1.95	U	25.5	UBP	1.55	U	70		28	E	ESE, 4/93
T2D	02/07/93	2.5		0.6		5	U	1.95	U	70				ASMGW93B
T2D	02/07/93			0.57										ASMGW93B
T2D	05/11/93	1.2	U	0.56		7	U	1.5	U	65				ASMGW93D
T2D	07/12/93	2	U	1.3	U	5.9	U	2.05	U	84.5				ASMGW93E
	MEDIAN	1	13	1	14	6	13	1.5	13	65	13	32.7	8	
T2E	11/07/90	0.625	U	0.5	U	2.05	U	9.7		38.9				ASMGW90A
T-2E	12/90	2.8	JL	2.15		224	Q	0.9		37.8	Q	34.1		ESE 6/91
	MEDIAN	1.7125	2	1.325	2	113.025	2	5.3	2	38.35	2	34.1	1	
WS-1	12/17/85	2.5		1		18		54		41		477		Tetra Tech #4, 1986
WS-2	12/17/85	2.5		1		438		79		70		189		Tetra Tech #4, 1986
WS-3	12/17/85	2.5		1		845		3700		15		110		Tetra Tech #4, 1986
WS-4	12/17/85	2.5		1		378		118		28		731		Tetra Tech #4, 1986
WS-5	12/17/85	2.5		1		18		65		388		807		Tetra Tech #4, 1986
WSP-1	12/29/87	2.8		2.5		15	UJ	3	UJ	13	UJ	30		Hill/CN, 1989
WSP-1D	9/91	1		1		11	UE	0.5		1		29.7		ESE 1/92
WSP-1D	02/21/92	3.5		0.5	U	3	U	1	U	2	U			ASMGW92B
WSP-1D	06/05/92	2.3	J	1.5	U	13.5	U	1.5	U	2	U	29.1	()	ASMGW92C
WSP-1D	9/92	3.75	UB	1.65	U	4.3	U	1	U	5.75	U	26	E	ESE, 1/93
WSP-1D	11/92	3.2	UBB	1.95	U	17.5	UBP	7		4	UBR	35	E	ESE, 4/93

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
WSP-1D	02/05/93	3.1		1.1	U	52	U	3	U	6.3	U	32	(D)	ASMGW93B
WSP-1D	05/12/93	2.7	UJ	0.02	U	9.5	U	1.3	U	6	U			ASMGW93D
WSP-1D	07/14/93	2.3		1.3	U	6.75	U	1.3	U	6	U			ASMGW93E
	MEDIAN	2.8	9	1.3	9	11	9	1.3	9	5.75	9	29.85	6	
WSP-2D	06/13/92	0.5	UJ	4.7	J					2	UJ			ASMGW92D
WSP-2D	9/92	5.8								14				ESE, 1/93
WSP-2D	05/21/93	2.4		0.33						11				ASMGW93C
WSP-2S		197		10.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		165		1.4		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		244		1.4		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S		72		5		NA		NA		NA		NA		ESA, 9/4/91
WSP-2S	1/14/87	72	S	5		80900		31600		226		870		Hill/CN, 1989
WSP-2S	01/16/92	656		0.5	U					88.8				ASMGW92A
WSP-2S	06/13/92	539		1.5	UJ					63.5	J			ASMGW92D
WSP-2S	9/92	606								82				ESE, 1/93
WSP-2S	01/05/93	617		15						118	UR	1170	(D)	ASMGW93A
WSP-2S	05/21/93	536		0.02	U					41				ASMGW93C
	MEDIAN	197	13	1.5	11	80900	1	31600	1	63.5	9	1020	2	
WSP-3D	1/15/88	1.5		8		35		58		43		1010		Hill/CN, 1989
WSP-3D	01/16/92	3	J	0.5	U					5.8				ASMGW92A
WSP-3D	06/13/92	0.5	UJ	1.5	UJ					2	UJ			ASMGW92D
WSP-3D	9/92	1.8	UB							11.5	UB			ESE, 1/93
WSP-3D	01/04/93	0.65	U	1.95	U					24	UR	1000	(D)	ASMGW93A
WSP-3D	01/04/93	0.65	U	1.95	U					28	UR	1030	(D)	ASMGW93A
WSP-3D	05/24/93	1.65	U	0.02	U					6	U			ASMGW93C
WSP-3S		1		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		1		8.3		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		7.5		0.6		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S		4.2		0.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-3S	1/15/88	1		2.5		156	EJ	309		18		1020		Hill/CN, 1989
WSP-3S	01/16/92	6.5	J	1.6						13.6				ASMGW92A
WSP-3S	06/13/92	1.2	J	9	J					9.7	J			ASMGW92D
WSP-3S	9/92	1.6	UB							19.5	UB			ESE, 1/93
WSP-3S	01/04/93	0.65	U	1.95	U					37	UR	1120	(D)	ASMGW93A
WSP-3S	05/24/93	4	U	0.02	U					1060				ASMGW93C
	MEDIAN	1.5	17	1.95	15	95.5	2	183.5	2	18	13	1020	5	
WSP-4	1/19/88	1		2.5		7.5		3	BJ	16		300		Hill/CN, 1989
WSP-4	9/91	2.2		2.1		11	UE	2.3		17.7		587.2		ESE 1/92
WSP-4	01/15/92	0.5	U	1.5	U					3	U			ASMGW92A
WSP-4	06/14/92	0.5	UJ	1.5	U					2	U			ASMGW92D
WSP-4	06/14/92	0.5	UJ	1.5	U					2	U			ASMGW92D
WSP-4	9/92	1.6	UB							6.5	UB			ESE, 1/93
WSP-4	01/05/93	1.6		1.95	U					180	UR	693	(D)	ASMGW93A
WSP-4	05/20/93	1.2		0.02	UJ					18	U			ASMGW93C

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
	MEDIAN	1.1	8	1.5	7	9.25	2	2.65	2	11.25	8	587.2	3	
WSP-5		4.9		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		2.7		0.8		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		1		12.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-5		1.8		1.9		NA		NA		NA		NA		ESA, 9/4/91
WSP-5	1/19/88	4.5	B	2.5		965	EJ	6890		100		950		Hill/CN, 1989
WSP-5	9/91	0.5		1		148	E	7240		173		1094		ESE 1/92
WSP-5	01/15/92	0.5	U	1.5	U					160				ASMGW92A
WSP-5	06/14/92	0.5	UJ	7.8						195				ASMGW92D
WSP-5	9/92	2.1	UB							103	UB			ESE, 1/93
WSP-5	01/05/93	0.65	U	1.95	U					124	UR	1090	(D)	ASMGW93A
WSP-5	05/20/93	1.6		3.1						263				ASMGW93C
	MEDIAN	1.6	11	2.225	10	556.5	2	7065	2	160	7	1090	3	
WSP-6D	12/28/87	2.6	B	7		17		9		13	UJ	68		Hill/CN, 1989
WSP-6S	12/28/87	4.7	B	2.5		7.5		8		13	UJ	47		Hill/CN, 1989
WSP-6S	9/91	2.1		2		5.5		0.5		2.2		53.4		ESE 1/92
WSP-6S	02/21/92	4		0.5	U	3	U	1	U	2.4				ASMGW92B
WSP-6S	06/05/92	2.9		1.5	U	13.5	U	1.5	U	2	U	57.8	()	ASMGW92C
WSP-6S	9/92	3.6	UB	1.65	U	313		3	UB	35		61	E	ESE, 1/93
WSP-6S	02/05/93	3.8		1.1	U	16	U	1.95	U	6.3	U	56	(D)	ASMGW93B
WSP-6S	05/18/93	4.3		0.16		6.75	U	1.3	U	9				ASMGW93D
WSP-6S	05/18/93	4.1		0.055	U	7.5	U	1.3	U	6	U			ASMGW93D
WSP-6S	07/19/93	5.8		1.3	U	5.9	U	2.015	U	7.6	UJ			ASMGW93E
	MEDIAN	3.9	10	1.4	10	7.5	10	1.725	10	6.95	10	56.9	6	
WSP-7D	1/15/88	1.5		2.5		19		26		38		210		Hill/CN, 1989
WSP-7S	1/15/88	41	S	5		577		592		60		60	J	Hill/CN, 1989
	MEDIAN	21.25	2	3.75	2	298	2	309	2	49	2	135	2	
WSP-8D	12/29/87	1		5		68	BJ	15	J	36	J	92		Hill/CN, 1989
WSP-8S	12/29/87	1		2.5		68	BJ	175		22	J	420		Hill/CN, 1989
	MEDIAN	1	1	3.75	2	68	2	95	2	29	2	256	2	
WSP-9	12/28/87	6.8	B	5		7.5		22		6.5	J	63		Hill/CN, 1989
WSP-9	9/91	5.7		1		11	UE	0.5		1		102.7		ESE 1/92
WSP-9	02/21/92	7		0.5	U	3	U	1	U	2	U			ASMGW92B
WSP-9	06/05/92	3.8	J	1.5	U	13.5	U	1.5	U	2	U	84.7	()	ASMGW92C
WSP-9	9/92	9.3		1.65	U	4.3	U	1	U	5.75	U	101	E	ESE, 1/93
WSP-9	11/92	4.25	UBR	4		13.5	UBB	1.55	U	4.5	UBP	96	E	ESE, 4/93
WSP-9	02/05/93	6.2		1.1	U	29.5	U	1.95	U	6.3	U			ASMGW93B
WSP-9	02/05/93	8.8		0.05	U	4.6	U	1.95	U	6.3	U			ASMGW93B
WSP-9	02/05/93			0.055	U					0				ASMGW93B
WSP-9	05/12/93	8.4		0.04		6.75	U	1.3	U	6	UR			ASMGW93D
WSP-9	07/14/93	6		1	U	6.75	U	1.3	U	6	U			ASMGW93E
	MEDIAN	6.5	10	1	11	7.125	10	1.4	10	5.75	11	96	5	

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WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
WSP-10D	1/13/88	1.5		2.5		15	S	1870		116		1100		Hill/CN, 1989
WSP-10D	01/17/92	3.6	J	0.5	U					2.1				ASMGW92A
WSP-10D	06/14/92	0.5	UJ	4.4	J					2	UJ			ASMGW92D
WSP-10D	9/92	4.6								7.5	UB		E	ESE, 1/93
WSP-10D	01/04/93	2.5		1.95	U					11	UR	643	(D)	ASMGW93A
WSP-10D	05/21/93	0.75	U	0.375	U					10				ASMGW93C
WSP-10S		17		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-10S		14		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-10S	1/14/88	14	S	2.5		100		9990		250		710		Hill/CN, 1989
WSP-10S	9/91	13.9		1		NA		NA		266		NA		ESE 1/92
WSP-10S	9/92	7.75	UB							114.5	UB		E	ESE, 1/93
	MEDIAN	4.6	11	2.5	9	57.5	2	5930	2	11	9	710	3	
WSP-11D	1/14/88	1.5		5		395		18200		281		720		Hill/CN, 1989
WSP-11D	01/17/92	1	U	0.5	U					46.3				ASMGW92A
WSP-11D	06/13/92	0.5	UJ	5.6	J					28.5	J			ASMGW92D
WSP-11D	9/92	4.5								23.5	UB		E	ESE, 1/93
WSP-11D	01/04/93	1.3	U	1.95	U					53	UR	528	(D)	ASMGW93A
WSP-11D	05/24/93	1.2	U	0.175	U					41	U			ASMGW93C
WSP-11S		105		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-11S		3.3		6		NA		NA		NA		NA		ESA, 9/4/91
WSP-11S	1/14/88	33	S	6		29400		18100		747		790		Hill/CN, 1989
WSP-11S	9/91	22.6	S	0.5		NA		NA		123		NA		ESE 1/92
WSP-11S	01/17/92	24.1	J	0.5	U					37.2				ASMGW92A
WSP-11S	06/13/92	195	J	1.5	UJ					598	J			ASMGW92D
WSP-11S	9/92	16.35	UB							47	UB		E	ESE, 1/93
WSP-11S	01/04/93	23.3		1.95	U					42	UR	592	(D)	ASMGW93A
WSP-11S	05/24/93	168		0.02	U					733				ASMGW93C
	MEDIAN	16.35	15	1.95	13	29400	1	18100	1	47	13	656	4	
WSP-12D	1/18/88	1		2.5		7.5		20		18		55		Hill/CN, 1989
WSP-12D	01/15/92	0.5	U	1.5	U					3	U			ASMGW92A
WSP-12D	06/13/92	0.5	UJ	1.5	UJ					2	UJ			ASMGW92D
WSP-12D	9/92	4.4								2.85	U		E	ESE, 1/93
WSP-12D	01/05/93	0.65	U	1.95	U					5.7	UR	144	(D)	ASMGW93A
WSP-12D	05/21/93	0.49	U	0.02	U					14	U			ASMGW93C
WSP-12S		2.4		9		NA		NA		NA		NA		ESA, 9/4/91
WSP-12S		1		6.8		NA		NA		NA		NA		ESA, 9/4/91
WSP-12S	1/18/88	2.4	B	5		49	E	7620		233		250		Hill/CN, 1989
WSP-12S	9/91	1.2		2.2		NA		NA		114		NA		ESE 1/92
WSP-12S	9/91	1.3	WG	2.9		NA		NA		115		NA		ESE 1/92
WSP-12S	9/91	0.5		1		NA		NA		109		NA		ESE 1/92
WSP-12S	01/15/92	1.2		1.5	U					101				ASMGW92A
WSP-12S	06/13/92	1.6	J	5.6	J					113	J			ASMGW92D
WSP-12S	9/92	4.2								97			E	ESE, 1/93
WSP-12S	01/05/93	0.65	UJ	1.95	U					8	UR	573	(D)	ASMGW93A

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
WSP-12S	05/21/93	0.49	U	0.56						143				ASMGW93C
WSP-12S	05/21/93	0.49	U	0.57						148				ASMGW93C
	MEDIAN	1	18	1.95	16	28.25	2	3820	2	99	16	197	4	
WSP-13D	1/18/88	1		2.5		7.5		18		24		760		Hill/CN, 1989
WSP-13D	01/16/92	1	U	0.5	U					2	U			ASMGW92A
WSP-13D	06/13/92	0.5	UJ	1.5	UJ					2.1	J			ASMGW92D
WSP-13D	9/92	5.1								13			E	ESE, 1/93
WSP-13D	01/05/93	3.8	J	1.95	U					27	UR	829	(D)	ASMGW93A
WSP-13D	05/21/93	1.9		0.12						7				ASMGW93C
WSP-13S		61		11.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-13S		41		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-13S	1/18/88	41	S	2.5		23300	E	16600		29		1300		Hill/CN, 1989
WSP-13S	9/91	84.7	S	0.5		NA		NA		43.6		NA		ESE 1/92
WSP-13S	01/16/92	87.5	J	0.5	U					45.8				ASMGW92A
WSP-13S	06/13/92	81.4	J	4.5	J					32.9	J			ASMGW92D
WSP-13S	9/92	88.6								49			E	ESE, 1/93
WSP-13S	01/05/93	1.8		1.95	U					14	UR	1200	(D)	ASMGW93A
WSP-13S	05/21/93	87.9		0.02	U					59				ASMGW93C
	MEDIAN	41	15	1.95	13	11653.75	2	8309	2	27	13	1014.5	4	
WSP-14D	1/18/88	1		5		36	E	1400		29		350		Hill/CN, 1989
WSP-14D	01/15/92	0.5	U	1.5	U					3	U			ASMGW92A
WSP-14D	06/13/92	1.1	J	7.8	J					2	UJ			ASMGW92D
WSP-14D	9/92	2.4	UB							5	U		E	ESE, 1/93
WSP-14D	01/05/93	3.2		4						7	UR	340	(D)	ASMGW93A
WSP-14D	05/21/93	2.8		0.17						10				ASMGW93C
WSP-14S		3.6		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-14S		7.1		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-14S	1/18/88	7.1	B	2.5		45	E	387		40		310		Hill/CN, 1989
WSP-14S	9/91	3.3		1		NA		NA		32.2		NA		ESE 1/92
WSP-14S	01/15/92	0.5	U	1.5	U					31.7				ASMGW92A
WSP-14S	06/13/92	2.7	J	8.8	J					33.9	J			ASMGW92D
WSP-14S	06/13/92	2.3	J	4	J					32.3	J			ASMGW92D
WSP-14S	9/92	3.15	UB							22.5	UB		E	ESE, 1/93
WSP-14S	01/05/93	4.3		1.95	U					48	UR	347	(D)	ASMGW93A
WSP-14S	05/21/93	4.3		0.02	U					34				ASMGW93C
	MEDIAN	2.975	16	2.5	14	40.5	2	893.5	2	30.35	14	343.5	4	
WSP-15D	1/20/88	1		2.5	NE	7.5		37	J	28	J	720		Hill/CN, 1989
WSP-15D	5/20/88	1		2.5		28	U	53300		37.1	J	606		HILL/CN, 1989
WSP-15S	1/20/88	6.7	B	2.5	NE	25	EJ	738		27	J	100		Hill/CN, 1989
WSP-15S	5/20/88	6.5	B	2.5		259		12700		36.1	J	128		Hill/CN, 1989
	MEDIAN	3.75	4	2.5	4	26.5	4	6719	4	32.05	4	367	4	
WSP-16D	1/19/88	1		2.5		19	EJ	8320		17		960		Hill/CN, 1989

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
WSP-16D	5/20/88	1	UW	2.5		70.1		66400		6.3	J	1060		Hill/CN, 1989
WSP-16D	01/15/92	0.5	U	1.5	U					3	U			ASMGW92A
WSP-16D	06/13/92	0.5	UJ	1.5	UJ					2	UJ			ASMGW92D
WSP-16D	9/92	0.65	UB							10	UB		E	ESE, 1/93
WSP-16D	01/04/93	0.65	U	1.95	U					21	UR	777	(D)	ASMGW93A
WSP-16S		1		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-16S		1		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-16S	1/19/88	1		2.5		128	EJ	5800		6.5	U	1100		Hill/CN, 1989
WSP-16S	5/20/88	1	UW	2.5		573		70300		33.5	J	1130	J	Hill/CN, 1989
WSP-16S	9/91	1.2		2.4		NA		NA		35.3		NA		ESE 1/92
WSP-16S	01/15/92	1.2		1.5	U					23.4				ASMGW92A
WSP-16S	06/13/92	0.5	UJ	1.5	UJ					29.6	J			ASMGW92D
WSP-16S	9/92	3.1								21	UB		E	ESE, 1/93
WSP-16S	01/04/93	0.65	U	1.95	U					46	UR	679	(D)	ASMGW93A
	MEDIAN	1	15	2.4	13	99.05	4	37360	4	21	13	1010	6	
WSP-17		2		11.7		NA		NA		NA		NA		ESA, 9/4/91
WSP-17		4.9		2.5		NA		NA		NA		NA		ESA, 9/4/91
WSP-17	1/25/88	4.9	B	219		4000	EJ	14500		1250		980		Hill/CN, 1989
WSP-17	5/24/88	1		11.7		2360		68300		1180		1110	J	Hill/CN, 1989
WSP-17	9/91	7.7		0.5		NA		NA		944		NA		ESE 1/92
WSP-17	01/15/92	9.6		1.5	U					851				ASMGW92A
WSP-17	01/15/92	8.5		1.5	U					862				ASMGW92A
WSP-17	01/15/92	9.5		1.5	U					894				ASMGW92A
WSP-17	06/13/92	5.4	J	1.5	UJ					772	J			ASMGW92D
WSP-17	9/92	6.3	UB							828			E	ESE, 1/93
WSP-17	01/04/93	8.5		1.95	U					800	UR	876	(D)	ASMGW93A
WSP-17	05/21/93	6.6	U	0.02	U					840				ASMGW93C
	MEDIAN	6.45	12	1.5	13	3180	2	41400	2	856.5	10	980	3	
WSP-18D	1/20/88	1		2.5		27	EJ	3630		29		250		Hill/CN, 1989
WSP-18D	5/24/88	1	UW	5.8		174		28000		69.2		335	J	Hill/CN, 1989
WSP-18S	1/20/88	4	B	2.5		40	EJ	91		30	J	510		Hill/CN, 1989
WSP-18S	5/24/88	2.9	B	10.9		28	U	27300		18.8	BJ	420	J	Hill/CN, 1989
	MEDIAN	1.95	4	4.15	4	34	4	15465	4	24.4	4	377.5	4	
WSP-19D	1/26/88	1		2.5		7.5		97		27		460		Hill/CN, 1989
WSP-19D	5/24/88	1	UW	8.4		28	U	46200		6.2	BJ	484	J	Hill/CN, 1989
WSP-19D	01/16/92	1	U	0.5	U					2	U			ASMGW92A
WSP-19D	06/14/92	0.5	UJ	4						2	U			ASMGW92D
WSP-19D	9/92	1.8	UB							6	UB		E	ESE, 1/93
WSP-19D	01/04/93	1.8		1.95	U					14	UR	598	(D)	ASMGW93A
WSP-19D	05/21/93	0.65	U	0.04						11				ASMGW93C
WSP-19S		1		7.1		NA		NA		NA		NA		ESA, 9/4/91
WSP-19S		1		5		NA		NA		NA		NA		ESA, 9/4/91
WSP-19S	1/26/88	1		5		3630	EJ	11600		48		980		Hill/CN, 1989
WSP-19S	5/24/88	1	UW	7.1		8650		67900		16.6	BJ	1030	J	Hill/CN, 1989

APPENDIX

WELL NUMBER	DATE	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n	REFERENCE
WSP-19S	01/16/92	2.7	J	0.5	U					2	U			ASMGW92A
WSP-19S	06/14/92	1.2	J	1.5	U					3.5				ASMGW92D
WSP-19S	9/92	6								20			E	ESE, 1/93
WSP-19S	01/04/93	4		1.95	U					16	UR	739	(D)	ASMGW93A
WSP-19S	05/21/93	1.7	U	0.21	U					24	U			ASMGW93C
	MEDIAN	1	16	2.225	14	1829	4	28900	4	12.5	14	668.5	6	
WST2	10/24/85	1.1		1		4		1		55		39.4		USGS
WST3	9/17/86	8.5		3		1670		3360		1.5		452		USGS
	1/27/87	6.7		6		1890		2730		1.5		712		USGS
	8/4/87	8.1		1		1170		1080		1.5		345		USGS
	8/29/89	9.1		2.5		541		63		10		664		USGS
	MEDIAN	8.3	4	2.75	4	1420	4	1905	4	1.5	4	558	4	
WST3A	8/4/87	0.9		1		0.5		1320		1.5		147		USGS

NOTES:

U = Below detection limit
NA = not analyzed
W = post digestion spike for GFAA outside control limits
G = GFAA analytical spike control limits exceeded
N = lab spike sample results outside control limits
S = matrix spike control limits exceeded
J = estimated due to QC problems
L = LCS control limits exceeded
Q = qualified as undetected because of blank contamination
B = value less than contract but greater than instrument detection limit
E = estminated due to interference
n= number of samples

REFERENCES:

ASMGW85A: ANACONDA SMELTER RI/FS: PHASE I DATA COMPILATION, TETRA TECH, INC.

SBCGW91C: FINAL, SILVER BOW CREEK/BUTTE AREA NPL SITE, STREAMSIDE TAILINGS OPERABLE UNIT RI/FS, 1991 REMEDIAL INVESTIGATION ACTIVITIES, CANONIE ENVIRONMENTAL SERVICES CORP.

ASMGW91B: ANACONDA REGIONAL WATER AND WASTE INVESTIGATIONS, DATA SUMMARY REPORT, PERIOD ENDING JUNE 30, 1991, VOL. 1, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW90A: OLD WORKS WATER QUALITY DATA SUMMARY REPORT, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW92C & ASMGW92D: ANACONDA REGIONAL WATER AND WASTE OPERABLE UNIT, DATA SUMMARY REPORT, SECOND QUARTER 1992, DRAFT, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW92B: FINAL, ANCONDA REGIONAL WATER AND WASTE OPERABLE UNIT, DATA SUMMARY REPORT, FOURTH QUARTER 1991 AND FIRST QUARTER 1992, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW93B: DRAFT, DATA SUMMARY REPORT FOR THE ANACONDA REGIONAL WATER AND WASTE INVESTIGATION, FIRST QUARTER 1993, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW93D: DRAFT, DATA SUMMARY REPORT FOR THE ANACONDA REGIONAL WATER AND WASTE INVESTIGATION, SECOND QUARTER 1993, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ASMGW93E-J: ANACONDA REGIONAL WATER AND WASTE OPERABLE UNIT, DATA SUMMARY REPORTS, THIRD QUARTER, VOL. 1, TECHNICAL REPORT, DRAFT, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

SBCGW85A: SILVER BOW CREEK REMEDIAL INVESTIGATION FINAL REPORT, MULTITECH.

SBCGW87A: SILVER BOW CREEK CERCLA, PHASE II REMEDIAL INVESTIGATION DATA SUMMARY, WARM SPRINGS PONDS OPERABLE UNIT. VOL. I: TEXT, CHEN-NORTHERN, HELENA.

SBCGW91A-B: FINAL, SILVER BOW CREEK/BUTTE AREA NPL SITE, STREAMSIDE TAILINGS OPERABLE UNIT RI/FS, 1992 DATA SUMMARY REPORT, VOL. 1 OF 3, CANONIE ENVIRONMENTAL SERVICES CORP.

Tetra Tech, 1985: ARBITER WORKS DRAFT REMEDIAL INVESTIGATION, August, 1985.

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and: GROUNDWATER INVESTIGATION DATA REPORT SPRING 1985, July, 1985.

Data from the above sources can also be found in Tetra Tech, 1986:

PTI R/I F/S, 1991: SMELTER HILL REMEDIAL INVESTIGATION AND FEASIBILITY STUDY, Preliminary Site Characterization, November 1991.

Hill/CN, 1989: FINAL SILVER BOW CREEK CERCLA PHASE II REMEDIAL INVESTIGATION DATA SUMMARY WARM SPRINGS PONDS OPERABLE UNIT,

Tetra Tech #4, 1986: ANACONDA SMELTER RI/FS, Technical Memorandum No. 4, Domestic Wellwater Sampling, March 1986.

Hill 2/91: DRAFT FINAL CLARK FORK RIVER SITE SCREENING STUDY, February, 1991, CH2M Hill & Chen Northern.

ESA, 1991: EVALUATION OF ALTERNATIVES FOR POND 1 AND BELOW; Silver Bow Creek/Butte Area NPL Site.

ESE 6/91: OLD WORKS HYDROGEOLOGIC DATA SUMMARY REPORT AND PRELIMINARY SITE CHARACTERIZATION INFORMATION.

ESE 9/91: ANACONDA REGIONAL WATER AND WASTE INVESTIGATIONS DATA SUMMARY REPORT PERIOD ENDING JUNE 30, 1991.

ESE 1/92: Same as above for period ending September 30, 1991.

ESE 3/92: PRELIMINARY SITE CHARACTERIZATION FOR THE ANACONDA REGIONAL WATER AND WASTE OPERABLE UNIT.

Stiller, 1985: SILVER BOW CREEK CERCLA REMEDIAL INVESTIGATION PHASE I INTERIM GROUND WATER MEMORANDUM, May 3, 1985.

MBMG: Montana Bureau of Mines and Geology (STORET)

USGS: WATSTORE

ESE 9/92: DATA SUMMARY REPORT FOR THE ANACONDA REGIONAL WATER AND WASTE INVESTIGATION, THIRD QUARTER 1992, DRAFT, JANUARY 1993.

ESE 11/92: DATA SUMMARY REPORT FOR THE ANACONDA REGIONAL WATER AND WASTE INVESTIGATION, FOURTH QUARTER 1992, DRAFT, APRIL 1993

APPENDIX F

Groundwater Quality Parameters
Median Values
Anaconda, Montana

APPENDIX

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
1	3	3	2	3	50	3	29	3	134	3	98	3
3	4	5	2.5	5	73	5	10	5	40	5	491	4
9	3	3	1	3	32	3	10	3	128	3	21	3
10	9	3	1	3	73	3	26	3	19	3	39	3
11	2.5	4	1	3	22	4	12	4	25	4	17	4
16	2.5	3	2	2	100	3	14	3	46	3	370	3
18	2	5	1	5	41	5	10	5	109	5	30	3
19	3	3	2	3	61	3	19	3	29	3	189	3
20	2.3	2	6.0	2	155	2	64.7	2	1987	2	55	2
24	3	3	2	3	820	3	1740	3	20	3	259	3
26	3	3	2	3	5722	3	35920	3	30	3	1790	3
27	3	3	2	3	10400	3	24900	3	23	3	1700	3
28	19	4	1.5	4	58570	4	47250	3	108	4	2060	4
29	6	4	2	4	19840	4	25400	3	56	4	2120	4
30	3	3	2	3	3920	3	360	3	30	3	1210	3
31	3	3	2	3	435	3	81	3	64	3	1200	3
32	3	4	2	4	1708	4	561	4	28	4	1050	4
33	3	3	2	3	10810	3	316	3	30	3	43	3
34	2	4	9	4	497	4	222	4	1139	4	106	4
35	27	3	2	3	439	3	32	3	20	3	69	3
36	19	3	2	3	7150	3	157	3	634	3	1190	3
37	2.5	3	2	3	16510	3	10960	3	57	3	1380	3
38	2.5	1	2.5	1	1140	1	70	1	130	1	938	1
39	2.5	3	2	3	107	3	10	3	10	3	178	3
48	2	2	2	2	26	2	3.1	2	386	2	22	1
49	2	4	2	4	17	4	20	4	288	4	102	4
50	2.3	2	2	2	61	2	47.0	2	99	2	51	2
51	2.3	2	2	2	51	2	16	2	16	2	31	2
52	2.3	2	2	2	174	2	28	2	2	2	56	2
59	2.3	2	1.5	2	29	2	2	2	76	2	15	2
65	3.6	1	0.43	1	12.3	1	2.1	1	11.5	1		0
66	2.5	1	2.5	1	150	1	30	1	310	1	329	1
68	2.6	1	0.35	1	11.2	1	2.1	1	10.6	1		0
69	3	4	2	4	203	4	25	4	9	4	203	4
70	1.7	3	1	3	2430	3	87	2	14	3	1440	3
71	1.7	3	1	3	590	3	31	2	14	3	1071	3
72	1	12	3	13	10	12	1	12	534	12	55	8
73	1455	2	14	2	6180	2	2878	2	166	2	1009	2
75	1.5	3	21	3	2480	3	73600	3	12700	3	1830	2
76	2	10	1	10	2315	10	225	10	7	10	739	7
77	2	3	1	3	36	3	156	3	16	3	47	2
78	2	14	2	14	14	14	4	14	14	14	1325	6
79	2	10	1	10	10	10	15250	10	16	10	1505	6
80	2	2	2	2	240	2	95	2	23	2	216	2
81	1	10	1	10	16	10	47	10	12	10	1516	6
82	3	2	3	2	2140	2	34295	2	162	2	1935	2
84	499	2	4	2	45040	2	25760	2	423	2	1750	2
85	69	2	2	2	45550	2	19395	2	120	2	1760	1
88	514	2	8	2	29780	2	17705	2	875	2	1645	2
89	888	2	11	2	28575	2	6469	2	30	2	664	2
90	286	12	1	12	22900	12	5450	12	35	12	554	9

APPENDIX

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
91	3162	2	44	2	176800	2	71855	2	243	2	2095	2
93	8639	2	121	2	1136700	2	564800	2	31190	2	5660	2
94	42	2	3	2	69	2	4068	2	177	2	1175	2
96	660	1	14	1	151	1	4	1	34	1	98	1
97R	3300	1	29	1	1970	1	675	1	449	1	266	1
98	400	1	502	1	38	1	23	1	58400	1	934	1
99	3	2	2	2	45	2	3	2	46	2	27	2
100	4	2	2	2	38	2	2	2	51	2	66	2
200	1	13	1	13	13	13	2	13	4	13	29	9
201	1	16	1	16	8	15	3	15	102	15	25	8
202	1	14	1	14	12	13	4	13	228	13	26	8
203	1	15	7	15	9	15	3	15	2890	15	47	9
204	1	15	1	15	10	14	2	14	403	14	33	10
205	5	10	2	11	7	10	3	10	106	10	50	6
206	1	11	16	12	7	11	2	11	2050	11	67	8
207	1	10	1	10	7	9	2	9	3	9	87	6
208	1	8	1	9	8	8	2	8	3	8	17	6
209	1	9	5	9	8	9	3	9	507	9	76	6
210	88	6	1	6	10	6	3	6	5	6	37	3
211	48	6	1	6	10	6	4	6	3	6	73	4
212	1.1	7	2	7	20	7	3	7	3	7	18	5
213	1	7	5	7	11	6	9	6	1385	6	32	4
214	2	7	1	7	8	7	83	7	6	7	811	3
215	14	6	2	6	74600	6	24850	6	448	6	1940	4
216	5.7	5	2	5	213	5	321	5	10	5	911	4
217	228	13	1	14	24400	13	4540	13	110	13	792	9
218	17	12	3	12	8	12	8090	12	383	12	747	5
219	2	6	1	6	7	6	8	6	4	6	256	4
220	2	6	1	6	9	6	3	6	4	6	42	3
221	7	8	2	8	8	8	7	8	3	8	98	5
222	2	6	1	6	9	6	3	6	4	6	531	3
223	3.4	6	1	6	7	6	3	6	5	6	200	3
224	1	6	1	6	11	6	7	6	5	6	18	4
225	15	6	1	6	12	6	27	6	5	6	99	3
226	8	7	1	7	7	7	160	7	3	7	30	2
227	51	6	1	6	8	6	3	6	6	6	28	1
228	6.5	1	3	1	13	1	6	1	5.8	1	86	1
229	5.1	1	2	1	16	1	8	1	17	1	147	1
230	1	5	1	5	8	5	57	5	8	5	290	3
231	1.4	6	1	6	13	6	5	6	5	6	22	2
232	195	5	1	5	27	5	8	5	6	5	36	3
233	2.1	5	1	5	16	5	4	5	5	5	15	2
234	1.7	5	1	5	7	5	3	5	3	5	29	3
235	2.6	2	1.9	2	7	2		0	15800	2		0
304	3	1	0.4	1	16	1	NA	0	14	1	151	1
309	12	1	2.5	1	16	1	NA	0	110	1	42	1
311	2.7	1	0.3	1	16	1	NA	0	14	1	362	1
312	7	1	0.4	1	16	1	NA	0	14	1	215	1
314	3.1	1	0.3	1	16	1	NA	0	140	1	304	1
318	2.7	1	0.3	1	16	1	NA	0	160	1	258	1
319	3.3	1	0.4	1	160	1	NA	0	53	1	87	1

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
321	1.8	1	0.3	1	59	1	NA	0	100	1	76	1
328	2.7	1	0.3	1	16	1	NA	0	7	1	0	1
329	1.8	1	0.4	1	84	1	NA	0	14	1	45	1
336	2.7	1	0.3	1	830	1	NA	0	140	1	100	1
405	2.7	1	0.3	1	16	1	NA	0	14	1	482	1
408	2.7	1	0.3	1	16	1	NA	0	14	1	58	1
411	2.7	1	0.3	1	290	1	NA	0	90	1	180	1
501	2.3	1	0.3	1	16	1	NA	0	280	1	62	1
A1-BR2	5080	11	1	11	6	11	1	11	3	11	520	8
A1-BR3	16.2	8	1	8	8	8	2	8	6	8	96	5
A2-BR	1030	9	1	9	7	9	2	9	4	9	215	6
AN-001	2.5	1	1	1	NA	0	49	1	63	1	18	1
AN-002	2.5	1	1	1	NA	0	43	1	277	1	34	1
AN-003	2.5	1	2	1	NA	0	50	1	118	1	19	1
AN-004	2.5	1	1	1	NA	0	50	1	176	1	18	1
AN-005	2.5	1	1	1	NA	0	46	1	20	1	18	1
B4-BR	1270	10	41	10	14	10	22	10	535	10	451	5
C-1	3.5	2	0.7	2	29	2	75	2	30	2	205	1
C-2	2.0	2	1.6	2	72	1	80	1	219	2		0
C-3	1.4	2	9.8	2	66	1	711	1	1675	2	126	1
C-4	9.8	4	13.1	4	7180	2	5015	2	7790	4	161	1
C-5	3.0	2	0.7	2	528	1	4830	1	60	2		0
C-6	10	2	0.7	2	4220	1	1310	1	216	2	137	1
C-24	5	1	4.7	1	49	1	4880	1	271	1		0
C-25	3	1	2.7	1	31	1	1850	1	247	1		0
C-26	6	1	0.61	1	103	1	1040	1	42	1		0
C-27	8.1	1	0.39	1	45	1	1000	1	105	1		0
C-28	12.4	1	0.48	1	1820	1	2040	1	85	1		0
C2-AL	2370	9	2	9	12500	9	7390	9	8390	9	784	6
C2-BR	1150	7	1	7	7650	7	3820	7	3500	7	1010	5
CFR-3	1	5	1	5	819	5	3280	5	6	5	195	3
D2BR	20.1	1	2	1	188	1	1080	1	10.3	1	806	1
D3AL	38.4	1	1	1	3	1	0.5	1	1	1	1210	1
D3-AL1	67	9	1	9	20	9	4	9	14	9	1210	5
D3AL3	186	1	2	1	10	1	2	1	2	1	768	1
DW-1	0.6	1	0.02	1		0		0	11	1		0
DW-2	1.9	1	0.02	1		0		0	7.6	1		0
DW-3	1	1	0.02	1		0		0	27	1		0
DW-4	1	1	0.02	1		0		0	7.6	1		0
DW-5	7.9	1	0.02	1		0		0	8	1		0
DW-301	10	1	0	0	15	1		0	40000	1	20	1
DW-304	5	1	0	0	15	1		0	30	1	151	1
DW-309	5	1	5	1	15	1		0	110	1	42	1
DW-311A	5	1	0	0	15	1		0	30	1	362	1
DW-312	5	1	0	0	15	1		0	30	1	215	1
DW-314	5	1	0	0	15	1		0	140	1	304	1
DW-318	5	1	0	0	15	1		0	160	1	258	1
DW-319	5	1	0	0	160	1		0	50	1	87	1
DW-321	0	0	0	0	60	1		0	100	1	76	1
DW-328	5	1	0	0	15	1		0	30	1	1	1
DW-329	0	1	0	0	80	1		0	30	1	45	1

APPENDIX

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
DW-336	5	1	0	0	830	1		0	140	1	100	1
E2AL	3.0	2	1	2	12	2	8	2	3	2	275	3
E2AL1	2	8	1	8	14	8	9	8	10	8	200	2
E2AL2	5.4	1	2	1	10	1	41.9	1	10.5	1	40	1
F2-BR	1	9	1	9	9	9	2	9	6	9	83	4
FH-1	3	6	2	6	30	6	1	6	9	6	24	6
FH-2	15	7	1	8	6	7	40	7	3	8	67	4
GW-01	2.7	2	2.5	2	18	2	3	2	17	2	28	2
GW-02	65	4	7	4	74450	4	26600	4	123	4	985	4
GW-03	1	5	7	5	35	5	98	5	18	5	1150	2
GW-04	1	2	2.5	2	18	2	3	2	22	2	349	2
GW-05	3	2	7.6	2	993	2	6940	2	125	2	1065	2
GW-06	5	5	3	5	17	5	6	5	13	5	47	5
GW-07	28	5	3	5	28	5	114	5	32	5	142	5
GW-08	1	5	3	5	28	5	15	5	22	5	101	5
GW-09	7	2	4	2	18	2	15	2	17	2	67	2
GW-10	2	5	3	5	46	5	2150	5	116	5	1010	5
GW-11	4	5	3	5	2630	5	15900	5	281	5	720	5
GW-12	1	5	3	5	28	5	35	5	18	5	106	5
GW-13	21	4	3	4	11664	4	8109	4	27	4	1030	4
GW-14	1	6	3	6	32	6	1225	6	28	6	410	6
GW-15	1	5	3	5	25	5	37	5	28	5	606	5
GW-16	1	5	3	5	70	5	8320	5	17	5	1060	5
GW-17	5	3	3	3	4000	3	14500	3	1250	3	1100	3
GW-18	2	4	4	4	34	4	1706	4	30	4	378	4
GW-19	1	4	6	4	1829	4	5399	4	22	4	732	4
LF-4	5	15	2	16	13	15	2	15	347	16	38	9
MBMG 44	NA	0	NA	0	NA	0	NA	0	NA	0	666	1
MBMG 63	NA	0	NA	0	NA	0	NA	0	NA	0	685	1
MBMG 1195	1.1	1	1	1	4	1	NA	0	130	1	39	1
MBMG 2670SP	NA	0	1	1	1	1	NA	0	2	1	74	1
MBMG2673	NA	0	1	1	9	1	NA	0	34	1	18	1
MBMG 2678	NA	0	1	1	10	1	NA	0	190	1	113	1
MBMG 2679	NA	0	1	1	10	1	NA	0	6	1	15	1
MBMG 2681	14.9	1	NA	0	11	1	NA	0	22	1	88	1
MBMG 2682	0.3	1	1	1	1	1	NA	0	16	1	20	1
MBMG 2702	NA	0	4	1	1	1	NA	0	2	1	590	1
MC1	5	1	1	1	NA	0	NA	0	150	1	NA	0
MC2	2.5	1	2.5	1	516	1	56	1	402	1	273	1
MC3	5	1	1	1	NA	0	NA	0	50	1	NA	0
MC4	5	1	1	1	NA	0	NA	0	110	1	NA	0
MC5	11	1	2	1	NA	0	NA	0	1600	1	NA	0
MC6	2.5	1	1	1	NA	0	NA	0	130	1	NA	0
MC7	5	1	1	1	NA	0	NA	0	1850	1	NA	0
MC8	5	1	0.5	1	NA	0	NA	0	180	1	NA	0
MC9	5	1	0.5	1	NA	0	NA	0	40	1	NA	0
MC10	2.5	1	1	1	NA	0	NA	0	20	1	NA	0
MC11	5	1	0.5	1	NA	0	NA	0	130	1	NA	0
MC12	10	1	0.5	1	NA	0	NA	0	20	1	NA	0
MC13	20	1	1	1	NA	0	NA	0	200	1	NA	0

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
MC14	3	1	6	1	NA	0	NA	0	20	1	NA	0
MC15	30	1	1	1	NA	0	NA	0	70	1	NA	0
MC16	13	1	0.5	1	NA	0	NA	0	20	1	NA	0
MC17	20	1	0.5	1	NA	0	NA	0	30	1	NA	0
MC18	5	1	6	1	NA	0	NA	0	2700	1	NA	0
MC19	5	1	2	1	NA	0	NA	0	4400	1	NA	0
MC20	2.5	1	1	1	13	1	43	1	40	1	23	1
MC21	2.5	1	1	1	14	1	52	1	76	1	16	1
MC22	2.5	1	1	1	18	1	52	1	24	1	27	1
MC23	2.5	1	1	1	88	1	42	1	21	1	30	1
MW-1	6	1	2.5	1	10	1	210	1	40	1	56	1
MW-1A	8	1	2.5	1	10	1	320	1	40	1	181	1
MW-2	6	1	5	1	820	1	170	1	20	1	185	1
MW-3	12	1	6	1	250	1	1080	1	110	1	62	1
NGP-1	167	1	0.03	1	19.6	1	0	0	23.6	1		0
OD-1,2,3	6.2	4	0.25	4	5606	4	312	4	34	4		0
OP-004	2.5	1	1	1	22	1	62	1	15	1	4	1
OP-005	2.5	1	1	1	27	1	68	1	295	1	4	1
OP-006	2.5	1	1	1	61	1	63	1	26	1	32	1
SA-1,2,3,4,5,6	52	8	0.2	8	37.5	8	106	8	474	8		0
SBL-2,5	2.2	2	33	2	1890	2	1713	2	27760	2		0
SP1	15	2	1	2	9	2	1	2	3	2	260	2
SRP-1	21.8	1	0.14	1	6.9	1	0	0	4.4	1		0
T1A	1	13	2	14	7	13	2	14	203	13	24	8
T1B	0.8	2	1.5	2	38.5	2	10.8	2	249	2	25	1
T1C	0.8	2	1.4	2	43.6	2	16.2	2	270	2	26	1
T1D	1	14	1	15	45	14	30	15	3	14	61	8
T1E	0.4	4	1.8	4	9.5	4	7.1	4	202	4	26	1
T-2	3	1	2	1	62	1	1	1	16	1	18	1
T2A	1	3	2.2	3	40.7	3	2	3	167	3	32	1
T2B	1	14	1	15	13	14	2	14	34	15	29	10
T-2C	2.6	3	2.2	3	47	3	0.9	3	173	3	32	3
T2D	1	13	1	14	6	13	2	13	65	13	33	8
T2E	1.7	2	1	2	113	2	5.3	2	38	2	34	1
WS-1	2.5	1	1	1	18	1	54	1	41	1	477	1
WS-2	2.5	1	1	1	438	1	79	1	70	1	189	1
WS-3	2.5	1	1	1	845	1	3700	1	15	1	110	1
WS-4	2.5	1	1	1	378	1	118	1	28	1	731	1
WS-5	2.5	1	1	1	18	1	65	1	388	1	807	1
WSP-1	2.8	9	1	9	11	9	1	9	6	9	30	6
WSP-2	197	13	2	11	80900	1	31600	1	64	9	1020	2
WSP-3	2	17	2	15	96	2	184	2	18	13	1020	5
WSP-4	1	8	2	7	9	2	3	2	11	8	587	3
WSP-5	2	11	2	10	557	2	7065	2	160	7	1090	3
WSP-6	4	10	1	10	8	10	2	10	7	10	57	6
WSP-7	21	2	4	2	298	2	309	2	49	2	135	2
WSP-8	1	1	4	2	68	2	95	2	29	2	256	2
WSP-9	7	10	1	11	7	10	1	10	6	11	96	5
WSP-10	5	11	3	9	58	2	5930	2	11	9	710	3
WSP-11	16	15	2	13	29400	1	18100	1	47	13	656	4

APPENDIX

WELL NUMBER	As (ug/L)	n	Cd (ug/L)	n	Fe (ug/L)	n	Mn (ug/L)	n	Zn (ug/L)	n	SO4 (mg/L)	n
WSP-12	1	18	2	16	28	2	3820	2	99	16	197	4
WSP-13	41	15	2	13	11654	2	8309	2	27	13	1015	4
WSP-14	3	16	3	14	41	2	894	2	30	14	344	4
WSP-15	4	4	3	4	27	4	6719	4	32	4	367	4
WSP-16	1	15	2	13	99	4	37360	4	21	13	1010	6
WSP-17	6	12	2	13	3180	2	41400	2	857	10	980	3
WSP-18	2	4	4	4	34	4	15465	4	24	4	378	4
WSP-19	1	16	2	14	1829	4	28900	4	13	14	669	6
WST2	1.1	1	1	1	4	1	1	1	55	1	39	1
WST3	8	4	3	4	1420	4	1905	4	2	4	558	4
WST3A	0.9	1	1	1	0.5	1	1320	1	1.5	1	147	1

n=number of samples